INTERNSHIP REPORT
AT PT PERTAMINA (PERSERO) RU V BALIKPAPAN

Arranged by:

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14 14 08076

INTERNATIONAL INDUSTRIAL ENGINEERING PROGRAM

FACULTY OF INDUSRTIAL TECHNOLOGY

UNIVERSITAS ATMA JAYA YOGYAKARTA

2017

VALIDITY SHEET
JOB TRAINING REPORT

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This report is made as the result of job training program in:

PT. PERTAMINA (PERSERO) REFINERY UNIT V BALIKPAPAN

Period of 4th September - 31st October 2017

Has been checked and approved by,

Job Training Advisor
PT. Pertamina (Persero) RU V Balikpapan

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SURAT KETERANGAN KERJA PRAKTEK

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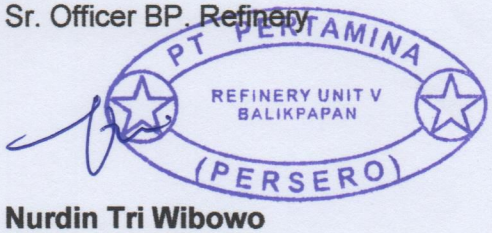
Telah menyelesaikan Praktek Kerja Lapangan di
PT Pertamina (Persero) Refinery Unit V Balikpapan
Bagian / Fungsi Supply Chain & Distribution
Periode 04 September 2017 s/d 31 Oktober 2017

Balikpapan, 31 Oktober 2017

Sr. Officer BP. Refinery



Nurdin Tri Wibowo

FOREWORD

Praise and thanks to God for the blessing and grace that has been given in this mean time so that this internship report can be done well.

This report is made as the complimentary of one of the requirements in the completion of internship program for Industrial Engineering, Faculty of Technology Industry, Universitas Atma Jaya student. This report is also proof of student knowledge of the company and also as the result of assignment given in the internship period.

There are many support and guidance that have been given from various parties in the process. Therefore in this occasion, gratitude is conveyed to:

1. The dean Faculty of Techonology Industry, Dr. A. Teguh Siswantoro and head of the Industrial Engineering Program, V. Ariyono, S.T., M.T. that have been given the opportunity to do the internship.
2. Coordinator of International Industrial Engineering Program, Ririn Diar Astanti, S.T., M.MT., D.Eng and also as the academical advisor who has helped by giving suggestion in order to do internship well.
3. Dr. Yosephine Suharyanti as the advisor lecturer of internship that has been given the chance by guidance in the process of internship.
4. Section Head Maintenance Area 1 PT. Pertamina (Persero) RU V Balikpapan, Paulus Soerjanto, who has been given much care in the process of internship.
5. Section Head Supply Chain & Distribution PT. Pertamina (Persero) RU V Balikpapan, Nur Fauzah, who has been given the chance to do the internship in this section.
6. Internship advisor from PT. Pertamina (Persero) RU V Balikpapan, Suharsono, who has been given the guidance in the process of internship.
7. All the staff in the Refinery Planning & Optimization PT. Pertamina (Persero) RU V Balikpapan, especially Supply Chain & Distribution section who have been given much knowledge and guidance in the process of this internship.
8. Others staff in PT. Pertamina (Persero) RU V Balikpapan that cannot be mentioned above who have been helped in the process of this internship.

9. Colleagues of Internship Program in Pertamina period of September – October 2017 who have been given many experience through sharing and discussion.

This report has been compiled as well as possible, but mistakes must be not being apart from this report, by this suggestion to improve the report is really welcomed. Lastly, this report is expected can be beneficially by giving the new knowledge to the readers.

Balikpapan, 30 October 2017

Author

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CHAPTER 1
INTRODUCTION

Background and objectives of the implementation of the internship will be explained in this chapter. This chapter will include explanation about the time and place, also placement area of internship.

1.1. Background

Department of Industrial Engineering, Atma Jaya Yogyakarta University (PSTI UAJY) defines the internship as a simulator that enables the students not only to apply the Industrial Engineering knowledge into real-world industry but also to train the student how to be a professional of Industrial Engineer. For this purpose, during the internship the students are requested to work in the host company within a period of month.

The paradigm of internship is that the students are expected to experience the application of Industrial Engineering knowledge in practice in which it can be obtained if during their internship the students do some activities to enhance their understanding in term of planning, designing, improving, implementing and problem solving. Therefore, during the internship period the students are requested to:

a. Doing all the tasks that have been assigned by the host company
b. Following all of relevant working procedures of the host company
c. Capturing the big picture of the enterprise system in the host company and observing its characteristics

Since Industrial Engineer is dealing with the integrated system of some elements which are Man, Machine, Material, Methods, Money, Energy, Environment and Information, therefore during the internship the students should relate all of their activities in term of system perspective. Based on the explanation above, it is clearly seen that internship is not only gathering the data.

Competencies held by students and Industrial Engineering graduates include:

1. System Design Work and Ergonomics.
2. Production Planning and Control.
3. Inventory / Inventory Management.
4. Quality Control System.
5. Material Handling System.

6. Logistics and Supply Chain Management.
7. Product Design and Development.
8. Occupational Safety and Health Techniques.
9. Design of Manufacturing Facility Layout.
10. Organizational Management.
11. Cost Analysis.
12. Industry Feasibility Analysis.
13. Process Design and CAD / CAM, and others.

1.2. Objective

The aims of the internship are:

a. Practice discipline
b. Improve the interaction between student and his/her ordinate or workmate
c. Practice adaptability in the working atmosphere
d. Observe the daily work in the host company
e. Enhance the Industrial Engineering knowledge in practice by seeing the practical work in the host company
f. Enhance the knowledge of enterprise system

1.3. Place and Time to do Internship

Internship was done in PT. Pertamina (Persero) Refinery Unit V Balikpapan in Supply Chain and Distribution Departement. Thei mplementation of internship program took two months period from 4th of September 2017 until 31st of October 2017.

CHAPTER 2
COMPANY OVERVIEW

In this chapter will be explained all things about the company, since established, the development, and currently conditions. This chapter contains history of the company, structure organization, and management of the company.

2.1. Company History

PT Pertamina (Persero) was established on 10th of December 1957, until now there were many changes and development happened. The history of Pertamina will be explained as followed.

2.1.1. History of PT Pertamina (Persero)

PT Pertamina (Persero) is a company owned by the government (BUMN) which carried out integrated business core in oil and gas Indonesia. Since 1870, oil exploration has been done in Indonesia. After left by colonialist, in 1950s, Indonesia started to manage all the exploration left by the Dutch. Established on 10th of December 1957, the name was PT Permina and in 1961 was changed into PN Permina. With the suggestion from rector of Universitas Indonesia, Prof. Dr. Ir. Sumantri as the mining ministry, on the 20th of August 1968, the president Soeharto take out the decrit to combine PN Permina and PN Pertamin as on PP No.27/1968 to become PN Pertamina. Those companies were state-owned company which Permina done the production and Pertamin done the marketing. The objective of action taken was to optimize the limited labor force, capital, and resource. On 15th of September 1971, PN Pertamina changed into Pertamina. Then in 17th of September 2003, this company changed its status into PT Pertamina (Persero).

PT Pertamina (Persero) is the only state-owned company that has the right to do all the activity in the oil and natural gas area in Indonesia. This company has two main activities, which are upstream activity that has obligation to find new sources of crude oil for the sustainability of the company's operation process and downstream activity that obligated in operation process of crude oil and natural gas, also the distribution and marketing activity of the final product.

Upstream activity then helped by some of these subsidiaries:

a. PT Pertamina EP (PEP)
b. PT Pertamina Geothermal Energy (PGE)

c. PT Pertagas

d. PT Pertamina Hulu Energy (PHE)

e. Drilling Service Hulu

f. Exploration and Production Technology Center (EPTC)

While downstream activity has obligation to fulfill the needs of fuel oil, special fuel, non-fuel oil product, and petrochemicals products from domestic or international. This activity is an integrated activity from the operation process, marketing, commerce, and shipping activity. In this business activity, processing activity of crude oil and natural gas is to make the products needed as the result of process. In the beginning, Pertamina has seven refinery units (RU), then RU I which is located in Pangkalan Brandan Sumatera closed in 2007 because of low capacity of production so the margin is too low while the capital needed is too much that cause company to loss. The illustration of refinery units owned by Pertamina and the capacity in MBSD (metric barrel stream day) shown in the Figure 2.1.

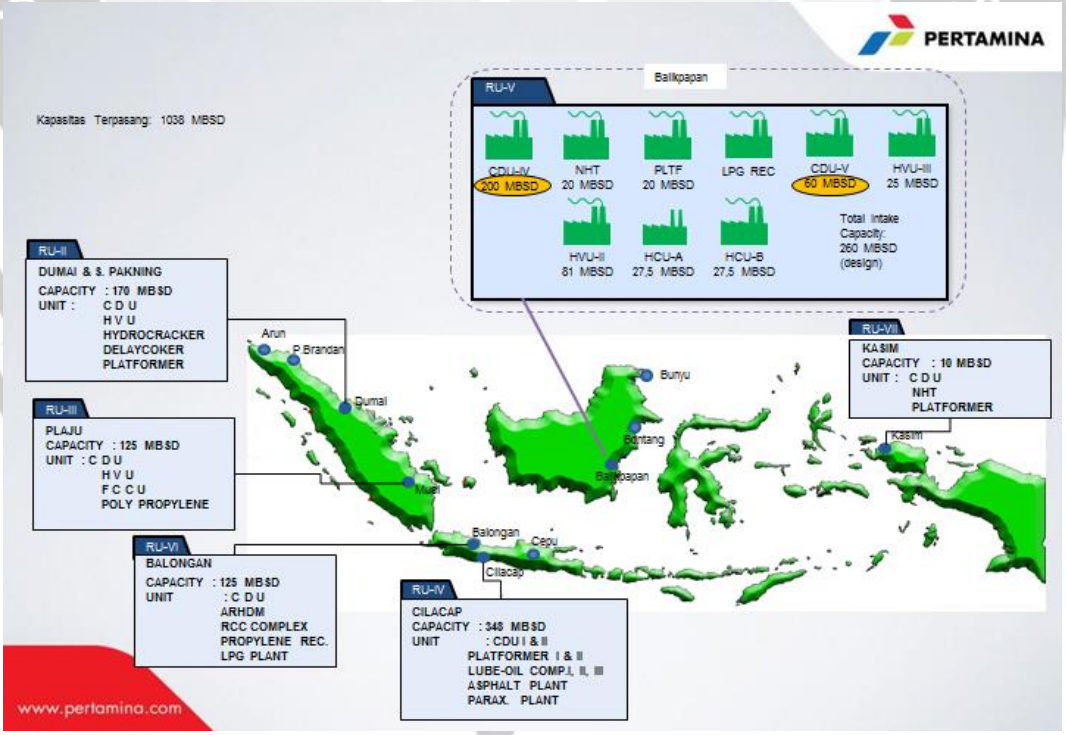


Figure 2.1. Refinery Units of PT Pertamina (Persero)

(Source: PT Pertamina RU V Balikpapan)

2.1.2. History of PT. Pertamina (Persero) RU V Balikpapan

Oil processing activity in Kalimantan started in 1897 where oil source is founded in Sanga Sanga. In the same year, oil drilling activity is done in *Sumur Minyak Mathilda* Balikpapan on 10th February which is become as the born date of Balikpapan.

Figure 2.2. *Sumur Minyak* Mathilda
(Source: PT Pertamina RU V Balikpapan)

Then in 1922, Shell Transport and Trading LTD build refinery unit in Balikpapan in order to process crude oil from Sepinggan, Attaka, Handil, Badak, Bekapai, and Tanjung this unit named as Kilang Balikpapan I. In the WWII era, this refinery unit was not operated because of the heavy damaged happened.

Figure 2.3. Construction of Kilang Balikpapan I by Shell Transport and Trading LTD
(Source: PT Pertamina RU V Balikpapan)

Figure 2.4. Kilang Balikpapan I in 1922

(Source: PT Pertamina RU V Balikpapan)

In 1948, Kilang Balikpapan I was fixed and re-operated in 1950. In 1966, Pertamina, which was Permina that era, bought the refinery unit and build Kilang Balikpapan II in 1980. Kilang Balikpapan II started the operation in 1984.

Figure 2.5. Construction process of Kilang Balikpapan II

(Source: PT Pertamina RU V Balikpapan)

Follow the history of Pertamina, in 1968 PN Pertamina was legalized and in 2003 changed into PT. Pertamina (Persero) where in Balikpapan named as PT. Pertamina (Persero) Unit Pengolahan V Balikpapan. On 9th of October 2008, this company changed into PT. Pertamina (Persero) Refinery Unit V Balikpapan. This refinery unit is the second largest unit Pertamina has after RU IV in Cilacap.

Figure 2.6. Current condition of Refinery Unit V Balikpapan

(Source: PT Pertamina RU V Balikpapan)

Until now, RU V Balikpapan has unit capacity for 260 MBSD that separated into two refinery area which are Kilang Balikpapan I and Kilang Balikpapan II which explained as below:

a. Kilang Balikpapan I

   This refinery unit has capacity up to 60 MBSD that separated into four processing units, which are:

   i. Crude Distilling Unit V (CDU V)
   ii. High Vacuum Unit III (HVU III)
   iii. Dehydration Plant (DHP)
   iv. Effluent Water Treatment Plant (EWPT)

b. Kilang Balikpapan II

   This refinery unit has capacity up to 200 MBSD that separated into two complex processing units, which are Hydroskimming Complex (HSC) and Hydrocracking Complex (HCC). HSC and HCC have processing units that explained as followed:

   i. Hydroskimming Complex
      1) Crude Distiling Unit IV
      2) Naptha Hydrotreating Unit
      3) Platforming Unit
      4) LPG Recovery Unit
      5) Sour Water Stripper

6) LPG Treater Unit

ii. Hydrocracking Complex

1) High Vacuum Unit II
2) Hydrocracking Unit
3) Hydrogen Plant

2.2. Organizational Structure

PT Pertamina (Persero) RU V Balikpapan use line structure organization, where the top authority is on General Manager (GM) RU V. GM has responsibility to the Senior Vice President Operation in Jakarta. This company groups their unit as the functions in the organization, means that GM supervises some units or functions which led by Senior Manager or Manager. These functions have some sub-functions which led by a Section Head, where Section Head will lead some supervisors and supervisors will lead the staff (Figure 2.7. and Figure 2.8.). The responsibility of each function and sub-function in PT Pertamina (Persero) RU V Balikpapan will be explained as followed.

2.2.1. Operation and Manufacturing Function

This function is led by a Senior Manager which has tasks to planning, processing, facilities development activity of equipment and material which can be used effectively and efficiently, also evaluating and controlling company's budget. This function separated into five sections, which are:

a. Production

This function led by a manager, has tasks to control and do operation in the refinery unit. This function then separated into some sections:

i. Distilling and Wax Plant Section

This section has responsibility to do the operations in CDU V, HVU III, Wax Plant, Dehydration Plant, and EWPT.

ii. Hydroskimming Complex Section

This section has responsibility for the operation in CDU IV, Naptha Hydrotreater, Platforming Process Unit, LPG Recovery Unit, LPG Treater, and Sour Water Stripper Unit

iii. Hydrocracking Complex Section

This section has responsibility for the operation in HVU II, Hydrocracker Unibon, Hydrogen Plant, Flare Gas Recovery Unit, and Hydrogen Recovery System.

iv. Utilities Section

This section has responsibility for the availability of the stream product, water and electricity for the sustainability of the refinery operation also for other supporting facilities like housing complex.

v. Oil Movement Section

Supporting processing unit which has responsibility as followed:

1) Arrange the discharge of crude oil that will be processed in the refinery unit.
2) Arrange and prepare for blending product as the order from Refinery Planning and Optimization Function to be sent after that.
3) Arrange loading product to the ship
4) Manage jetty facilities

vi. Laboratory

This section has responsibility to do the inspection and give analysis of the quality of crude and product, also research and development of the new products.

b. Refinery Planning and Optimization Function

This function has responsibility to planning, executing, coordinating works, also maintaining and increasing refinery capability. This function plans crude processing activity to have highest gross margin as the result. In general, this function has task to preparing and presenting economical perspective for refinery unit in Balikpapan, in example, reporting statistical data for product evaluation, crude blending result and administration, also as plan development so the maximum margin can be achieved according to the market and refinery conditions. This function separated into 3 sections, which are:

i. Refinery Planning Section

This section has responsibility to planning monthly and yearly processing activity and also crude.

ii. Supply Chain and Distribution Section

This section has responsibility to controlling crude scheduling which processed every day to the production team, informing processing realization, and controlling schedule for product blending and also the distribution activity.

iii. Budget and Performance Planning Section

This section has responsibility to monitoring and evaluating works performance daily, weekly and monthly, also do back casting.

c. Maintenance Planning and Scheduling Function

It is led by a manager, where this function is separated into four sections which every section is led by a section head. This function has responsibility to planning and scheduling maintenance service for mechanic equipment, rotating, electrical, and supporting instrument to support refinery operation capability. The sections in this function are listed as followed:

i. Planning and Scheduling Section
ii. Stationary Engineering Section
iii. Electrical and Instrument Engineer Section
iv. Rotating Equipment Engineer Section

d. Turn Around Function

This function has responsibility to provide maintenance services and planning maintenance scheduling for refinery equipment. Led by a manager, this function separated into three sections in where every section is led by a section head. Sections in this function are listed as followed:

i. Turn Around Section
ii. Scheduling Material and Service Support Section
iii. Equipment Overhaul Section

e. Maintenance Execution Function

This function has responsibility to provide service maintenance for mechanic equipment, rotating, electrical and instrument that support refinery operation. This function separated into five sections, which are:

i. Maintenance Area 1 Section
ii. Maintenance Area 2 Section
iii. Maintenance Area 3 Section
iv. Maintenance Area 4 Section
v. Workshop Section

2.2.2. Engineering and Development Function

This function has responsibility to evaluating refinery process, giving suggestion for refinery operation performance, also doing process development. This function is separated into five sections, which are:

a. Process Engineering Section

This section has responsibility in giving suggestion and recommendation for refinery operation in production area, doing process development and modification, and also evaluating refinery process and equipment. This function separated into some divisions, which are:

i. Development Division
ii. Process Control Division
iii. Environmental and Safety Process Division
iv. Engineer Contact Division

b. Facility Engineering Section

This section has responsibility to planning, coordinating, directing and controlling analysis activities and also do research for potential development of refinery equipment and problem solving for refinery operation. This section separated into some divisions, which are:

i. Mechanical Engineering
ii. Electrical Engineering
iii. Instrument Engineering
iv. Rotating Engineering
v. Material Engineering
vi. Civil Engineering

c. Project Engineering Section

This section has responsibility to arranging employment contract, managing and controlling planning activities, doing procurement process in goods and services, preparing modified blueprint for engineering problems, also handling the supervision of implementation all the project to have project result that meets the quality, budget, and schedule that has been set in order to achieve target. This section is separated into some divisions, which are:

i. Procurement
ii. Project Expert
iii. Construction Supervision
iv. Administration Project Engineering Control

d. Energy Conservation and Loss Control Section

This section has responsibility to planning, coordinating, directing and controlling problem solving also giving suggestion to functions about the use of energy and hydrocarbon pressure loss in RU V Balikpapan in order to increasing margin.

e. Total Quality Management Section

This section has responsibility to coordinating quality management system from organization quality standard, product quality, until environment.

2.2.3. Reliability Function

This function has responsibility to planning, implementing, coordinating works, maintaining and increasing refinery capability. This function is separated into some sections, which are:

a. Plant Reliability Section

This section has task to coordinating maintenance activities in refinery unit.

b. Equipment Reliability Section

This section has task to do inspection for the equipment in refinery unit.

2.2.4. Procurement Function

This function has responsibility in coordinating, managing, controlling and supervising all activities in material, equipment, transportation, and facilities procurement. Led by a manager who lead section head in every section, this function is separated into some sections, which are:

a. Inventory Section
b. Purchasing Section
c. Services and Warehousing Section
d. Contract Office Section

2.2.5. Health, Safety and Environment Function

This function has responsibility to managing employment safety in doing all the tasks. Led by a manager, this function separated into four sections which every section is led by a section head. Sections in this function are listed as followed:

a. Environmental Section
b. Fire and Insurance Section
c. Safety Section
d. Industrial Hygiene Section

2.2.6. Legal and General Affairs Function

This function has responsibility to managing, planning, coordinating also supervising al activities about company's security. Led by a manager in where

this function separated into three sections which every of them is led by a section head. Sections in this function are listed as followed:

a. Legal Section
b. Public Relation Section
c. Security Section

2.2.7. Human Resource Area Function

This function has responsibility to coordinating, evaluating, researching, and controlling all activities about wage payment, works planning and development, industrial relationship, employment welfare, also creating employees that suited to the vision and mission of company. Led by a manager, this function separated into five sections which every section is led by a section head. Sections in this function are listed as followed:

a. HR Development Section
b. Industrial Relation Section
c. Organizational Development Section
d. Medical Section
e. HR Service Section

2.2.8. Finance Function

This function has responsibility to planning, coordinating, directing and supervising finance activities which are budgeting, finance management, refinery control accounting, and also calculating analysis and finance prospect to reach maximum margin. Led by a manager who leads three assistant managers that listed as followed:

a. Finance and Business Support Assistant Manager
b. Oil Accounting Assistant Manager
c. Financial Accounting Assistant Manager

2.2.9. Information Technology Function

This function has responsibility to planning, developing, evaluating, and controlling system infrastructure. Led by a manager who leads two assistant managers that listed as followed:

a. Computer Operation Assistant Manager
b. Communication Operation Assistant Manager

2.2.10. Operation Performance Improvement Function

This function objective is to succeeding Pertamina transformation program that globally contains four main aspects that listed as followed:

a. Leadership
b. Technical Aspect
c. Mindset Capability
d. Infrastructure Management

Organizational structure in PT Pertamina (Persero) RU V Balikpapan can be seen in the Figure 2.2. as followed.

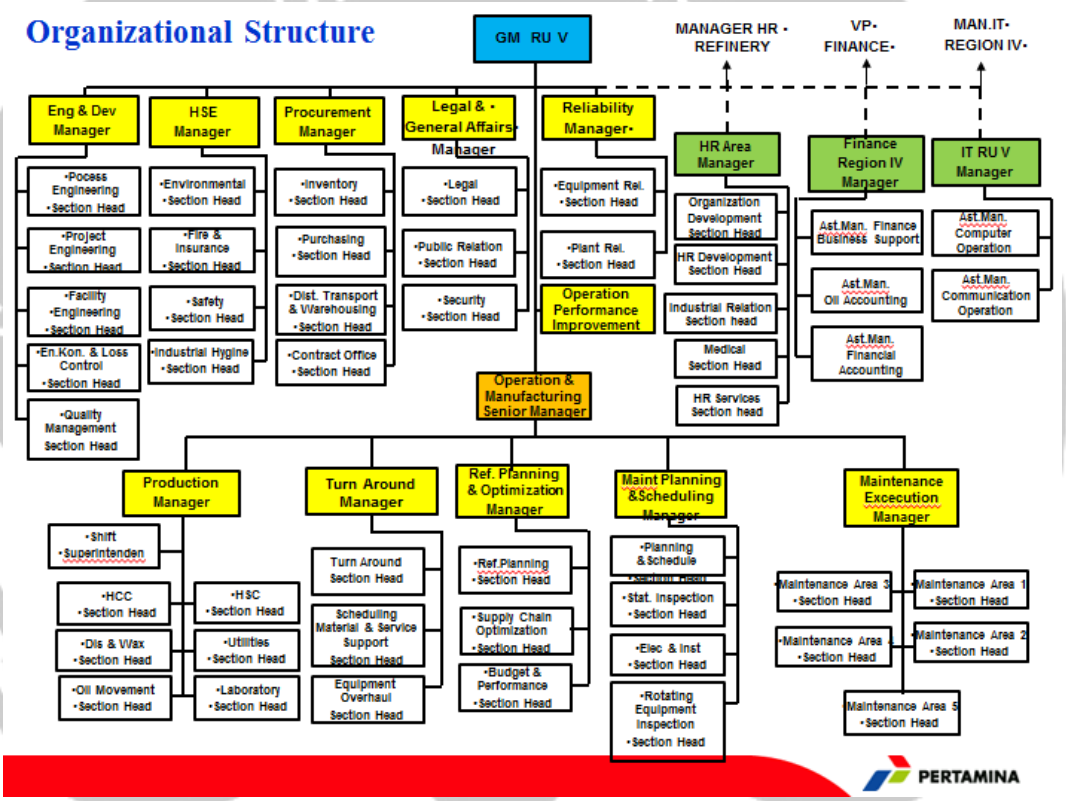


Figure 2.7. Organizational Structure PT Pertamina RU V Balikpapan

(Source: PT Pertamina RU V Balikpapan)

Organizational structure of Supply Chain and Distribution in PT Pertamina (Persero) RU V Balikpapan can be seen in Figure 2.8.

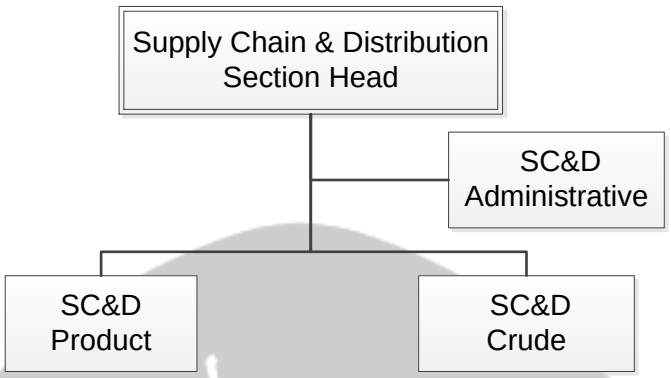


Figure 2.8. Organization Structure of Supply Chain & Distribution PT Pertamina (Persero) RU V Balikpapan

(Source: PT Pertamina RU V Balikpapan)

2.3. Management of PT. Pertamina (Persero) RU V Balikpapan

It will be explained in this section overview about company's management like vision and mission, corporate values, company's logo meaning, location and layout, company's policy about employment, source areas of crude oil that used, distribution areas of product, supporting facilities, also certification and appreciation achieved.

2.3.1. Vision, Mission and Coorporate Values of PT. Pertamina (Persero) RU V Balikpapan

Vision of PT. Pertamina PT. Pertamina (Persero) RU V Balikpapan is to become a world-class refinery unit that is competitive and environmentally sound. Mission of the company is explained as below:

a. Manage refinery operations safely, reliably, efficiently, and environmentally friendly to provide sustainable energy needs.
b. Optimize processing flexibility to maximize valuable product.
c. Beneficiary for the stakeholders.

In achieving vision and mission, Pertamina is commited to implementing the following values:

a. Clean

   A company that managed their operational propotionally, avoid conflict of interest, have no toleration in bribe act, uphold trust and integrity, and orient to the good governance.

b. Competitive

A company that can competes in regional and internasional scale, encourage growth through investment, build a cost conscious culture, and appreciate the performance.

c. Confident

Have role in national economic development, be a pioneer in BUMN, and build the nation's pride.

d. Customer focus

Oriented in customer interest and committed in providing the best service to customer.

e. Commercial

Create added value with a commercial orientation and making decisions based on sound business principles.

f. Capable

Managed by professional leaders and workers with high technical mastery and committed to build research and development capabilities.

2.3.2. Logo of PT. Pertamina (Persero)

Figure 2.9. Logo of PT Pertamina (Persero)

(Source: PT Pertamina RU V Balikpapan)

Logo Pertamina shaped like "P" in alphabets and presented as an arch which means Pertamina that always work on progressive. Type of font which is clear and firm means the transparency, braveness, and sincerety in act. The color in logo has meaning as explained below:

a. Blue, which means Pertamina that is reliable, trustworthy, and responsible.
b. Green, which means Pertamina that always use environmentally energy resources.
c. Red, which means tenacity and courage in facing challenges.

2.3.3. Location and Layout of PT. Pertamina (Persero) RU V Balikpapan

PT Pertamina (Persero) RU V Balikpapan is located in Jalan Kom. L. Yos Sudarso, Balikpapan, East Borneo. This company lies along the west side of Balikpapan bay. Reasons of the chosen location are explained as followed:

a. The location of the company is near to the source of crude oil which used as the main material to make products.
b. The availability of the area that enable company to do expansion for the office or the refinery unit.
c. Provided facilities form the Dutch that makes easier for the company to take over and do the development.
d. The location is near to the ocean and precisely on the main road that make it easier for the company to do the transaction by sea lane (ship) or land routes.
e. Strategic location to do the distribution of final products to the east side of Indonesia.

The location of RU V Balikpapan and its surrounding can be seen in the Figure 2.10. below.

Figure 2.10. Location of PT Pertamina RU V Balikpapan via Satelit

(Source: PT Pertamina RU V Balikpapan)

Geographical boundaries PT Pertamina (Persero) RU V Balikpapan will be explained as followed:

a. North : residences, harbor, local market, and office areas

b. East : residences and forest area

c. South : residences, harbor, local market, and office areas

d. West : beach area part of Balikpapan bay

Production units in RU V Balikpapan grouped into some complex areas according process relationship between units, process flow, also considering the distance for the crude that will be processed. Container tanks area placed on the north and south side of refinery unit. Office area placed near the production unit that they managed. Jetty placed along the west side of refinery unit. There are five main gates to enter the refinery unit, which is in every area secured with high level of security. Layout of PT Pertamina (Persero) RU V Balikpapan can be seen in the Figure 2.11.

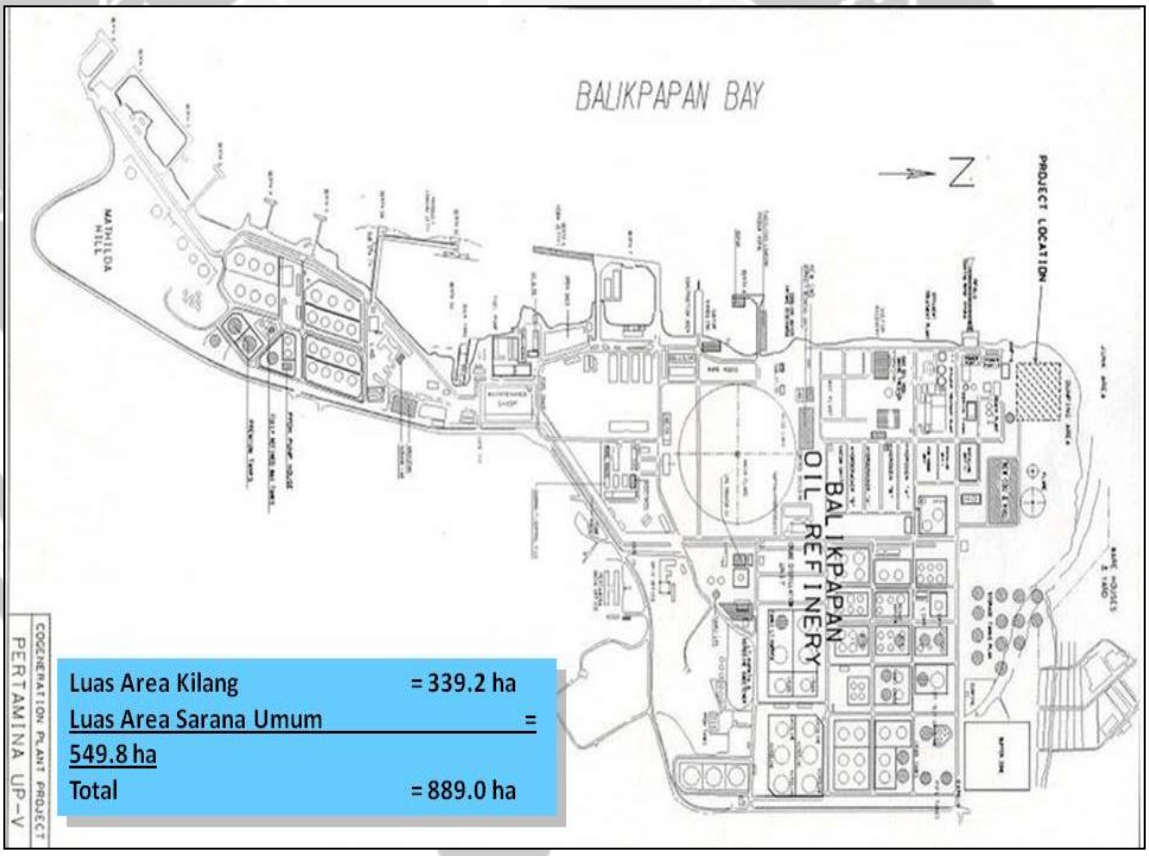


Figure 2.11. Layout of PT Pertamina (Persero) RU V Balikpapan

(Source: PT Pertamina RU V Balikpapan)

2.3.4. Employment Policy

In their activities, PT Pertamina (Persero) RU V Balikpapan divided their work hours as below:

a. Daily Workers

Daily workers will have 35 hours per week which explained as followed:

i. Monday – Thursday : 07.00 -16.00
   Break : 12.00 – 13.00
ii. Friday : 07.00 – 16.00
   Break : 11.30 – 13.30

b. Shift Workers

Shift workers work with the system 3 days on work and 1 day off which explained as followed:

i. Operation Workers
   Morning Shift : 08.00 – 16.00
   Afternoon Shift : 16.00 – 00.00
   Night Shift : 00.00 – 08.00
ii. Security Workers
   Morning Shift : 06.00 – 14.00
   Afternoon Shift : 14.00 – 22.00
   Night Shift : 22.00 – 06.00

Every worker has rights to take leave 12 days every year and once in 3 years they got 26 days on leave.

2.3.5. Source of Crude Oil

In the beginning, refinery unit in Balikpapan was designed to manage crude from Kalimantan area, in example, Handil, Attaka, Bekapai, Duri and Sepinggan. As time passes by, the resource of crude oil is running low. Currently, PT Pertamina (Persero) RU V Balikpapan does not just manage the domestic crude but also from International such as Asia and Africa. The illustration of changes in crude oil that experienced by Pertamina RU V can be seen in the Figure 2.12.

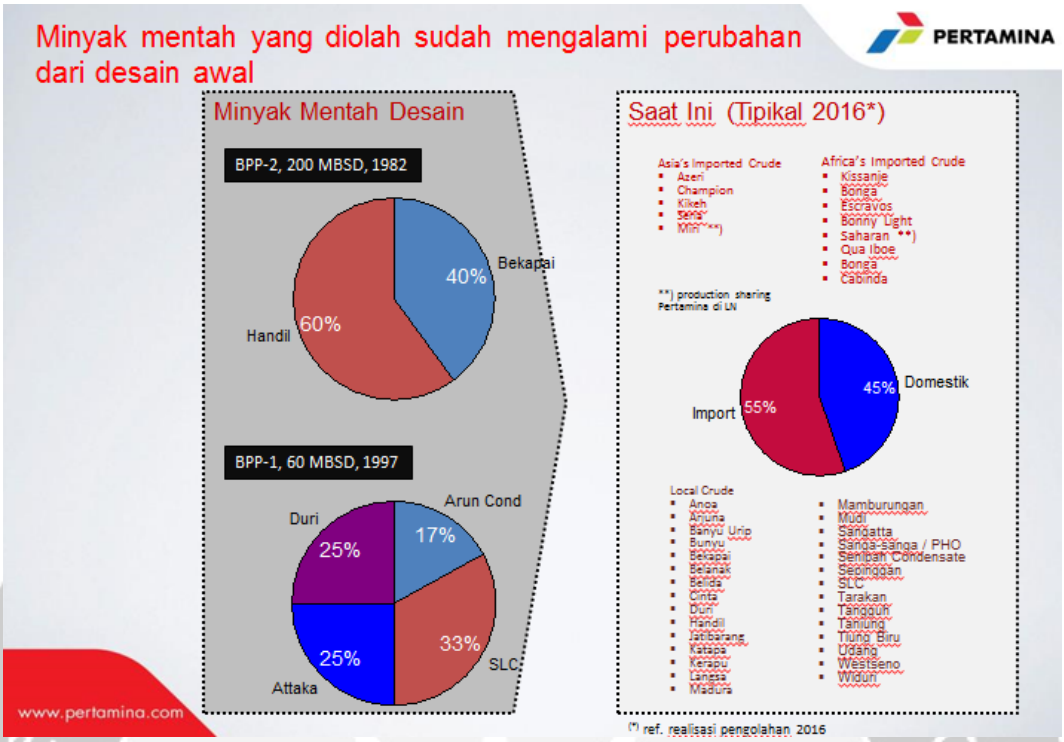


Figure 2.12. Changes in crude oil sources Pertamina RU V Balikpapan

(Source: PT Pertamina RU V Balikpapan)

2.3.6. Distributions Area

With the production volume of 93,781 million barrels (2016), PT Pertamina (Persero) RU V Balikpapan contributes 26% of the total production of PT Pertamina (Persero). RU V Balikpapan has important role to guarantee the supply of needed products in east side of Indonesia. Illustration for product distribution RU V Balikpapan can be seen in Figure 2.13.

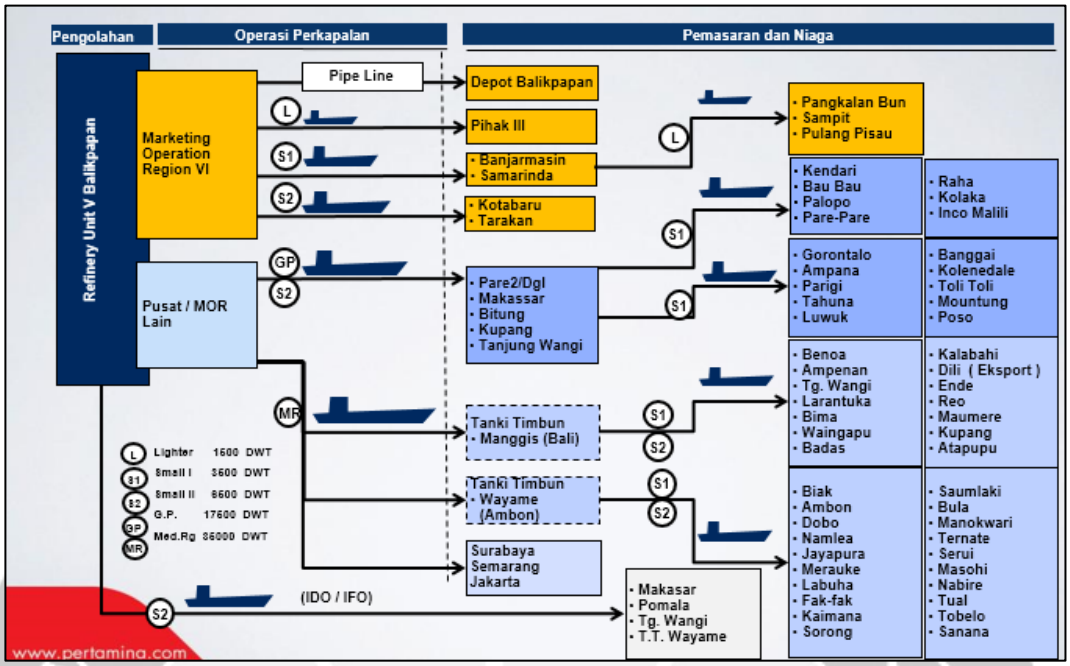


Figure 2.13. Distribution Flow of RU V Balikpapan Product

(Source: PT Pertamina RU V Balikpapan)

2.3.7. Supporting Facilities

Supporting facilities are provided by the company with the purpose to make communication become easier also to give convenient feeling so the productivity of workers can be increased. Supporting facilities in PT Pertamina (Persero) RU V Balikpapan will be explained as followed:

a. House and apartment

PT Pertamina (Persero) RU V Balikpapan has three housing complex and one apartment complex. This is provided to the workers according to their positions in the company.

b. Health facility

Every workers in PT Pertamina (Persero) RU V Balikpapan can access health facility that provided by Pertamina without fee. The facilities provided in RU V Balikpapan are:

i. Emergency clinic

This clinic is located inside the refinery unit as the first aid facility if works accidents happen.

ii. *Rumah Sakit Pertamina Balikpapan* (Hospital)

This hospital is an international class hospital that managed directly by PT Pertamina (Persero) RU V Balikpapan. This hospital also can be access by public.

c. Education facility

PT Pertamina (Persero) RU V Balikpapan gives chances to their employees to have higher education by giving them budget.

d. Recreation and sport facility

PT Pertamina (Persero) RU V Balikpapan provide facilities such as meeting hall and the supporting facilities to do sport like sport fields for football, basketball, volleyball, badminton, tennis, bowling arena and also swimming pool.

e. Communication and transportation facility

PT Pertamina (Persero) RU V Balikpapan provides communication facilities in housing complex, office area, and in the refinery area that enable thee workers to communicate easily. The company also provides car for the senior worker or upper manager positions, also cars and bicycle to be used in the refinery area.

f. Set of work equipment

Every worker, even the visitor in the refinery area, will be equipped with the batch and set of safety wear such as coverall clothes, ear plug, gloves, and safety helmet.

g. Information System Management

PT Pertamina (Persero) RU V Balikpapan use some of integrated information system that make their employee works much easier and faster.

2.3.8. Certification and Appreciation

Up until now, PT Pertamina (Persero) RU V Balikpapan has achieved many appreciation. Appreciations that they have achieved in HSE aspect can be seen in Table 2.1.

Table 2.1. Appreciation RU V Balikpapan in HSE aspect

No.	Appreciation
1	Appreciation of *Sobat Bumi* from Balikpapan government, May 2014, for CSR educational program

Continued from Table 2.1.

No.	Appreciation
2	Certification of Statement Of Performance from DNV to ISRS8 Level 5, October 2014
3	Appreciation of The Indonesia Best Green Award from The La Tofi School of CSR, June 2015
4	Appreciation of *Kecelakaan Nihil* from *Dinas Tenaga Kerja dan Transmigrasi* Republic of Indonesia, January 2015, for 31,233,611 safety workhours
5	Appreciation of *Patra Nirbhaya Karya Utama* from *Kementrian Energi dan Sumber Daya Mineral*, August 2015
6	Appreciation of *Program Pencegahan dan Penanggulangan HIV & AIDS* from *Kementrian Ketenagakerjaan* Republic of Indonesia, Silver Category, September 2015
7	*PROPER Biru* predicate for 2015
8	Appreciation of *Kecelakaan Nihil* from East Borneo governor, February 2016
9	Appreciation of *Kecelakaan Nihil* from *Kementrian Ketenagakerjaan* Republic of Indonesia, March 2016
10	Appreciation of *Program P2-HIV & AIDS di tempat Kerja* from *Kementrian Ketenagakerjaan* Republic of Indonesia, March 2016
11	Appreciation of Patra *Nirbhaya Karya Utama Adi Nugraha I* from *Kementrian Energi dan Sumber Daya Mineral*, August 2016
12	PROPER Biru predicate for 2016
13	Appreciation of *Sistem Manajemen Keselamatan dan Kesehatan Kerja* from Balikpapan government tahun 2017

In doing their business activities, PT Pertamina (Persero) RU V Balikpapan also committed to implement Corporate Social Responsibility (CSR) program. Appreciations in CSR aspect achieved by this company listed as in Table 2.2.

Table 2.2. Appreciation of RU V Balikpapan in CSR aspect

No.	Appreciation
1	*Pencegahan dan Penanggulangan HIV/AIDS* from Balikpapan government, January 2017
2	*Dahor Heritage* appointed as *Cagar Budaya Nasional* on September 2016
3	Best Community Program Award from Global CSR Award 2015: *"Pemberdayaan Masyarakat melalui Hutan Kemasyarakatan di Hutan Lindung Sungai Wain"*

Continued from Table 2.2.

No.	Appreciation
4	Balikpapan CSR Award 2013 Best of the best CSR in Balikpapan
5	Best Community Program Award from Global CSR Award 2013 : *"Kampung Atas Air"* in Davao, Philippine
6	Appreciation of Indonesian Green Award from La Tofi School Of CSR: *"Pelestari Keanekaragaman Hayati – program Ecopedition"*
7	Appreciation of CSR program in 2014 : "*Pertamina energy camp, pelatihan pendidik PAUD dan sosialisasi serta pemberian makanan tambahan pada balita"*

In doing their business process, PT Pertamina (Persero) RU V Balikpapan also uses integrated management system. Certification achieved by RU V Balikpapan in this aspect seen in the Figure 2.14.

Figure 2.14. Certification of Integrated Management System Pertamina RU V Balikpapan

(Source: PT Pertamina RU V Balikpapan)

CHAPTER 3
COMPANY SYSTEM OVERVIEW

In this chapter will be explained about company system overview such as business process, production system, and also production facilities.

3.1. Business Process

This section will explain on how a company doing their business activity and the relationship between one unit to the others. Business process in PT Pertamina (Persero) RU V Balikpapan is explained as followed.

3.1.1. Business Process of PT Pertamina (Persero) RU V Balikpapan

PT Pertamina (Persero) RU V Balikpapan has three main activities in doing their business, which are crudes and intermedia material inventory management, production process, and distribution products. Like the others company, Pertamina RU V Balikpapan processes input like material, equipment and machine, technology, human resource, information, and also business capital to makes ouput which are fuel oil, special fuel, non-fuel oil, petrochemical, and gas as the result products. In doing their business process, this company supported with some supporting units that has direct interaction with the main activities, such as:

a. Energy and utility preparation
b. Supply Chain Management (SCM) activities in goods or services
c. Technology planning and development
d. Health, Safety, Security and Environment management
e. Quality inspection
f. Implementation of process capability program

Those activities then supported with the supporting process such as:

a. Human Resource Management
b. Information and Communication Technology Management
c. Financial Management
d. Non-operational Asset Management
e. Legal and Compliance Management
f. External Relationship Management
g. Business Capability Management

In doing their process business, this company also affected with internal and external factor from the environment such as vision and mission, company's regulations and policies, changes in market condition, weather, and also government regulations. Illustration of PT Pertamina (Persero) RU V Balikpapan can be seen in the Figure 3.1.

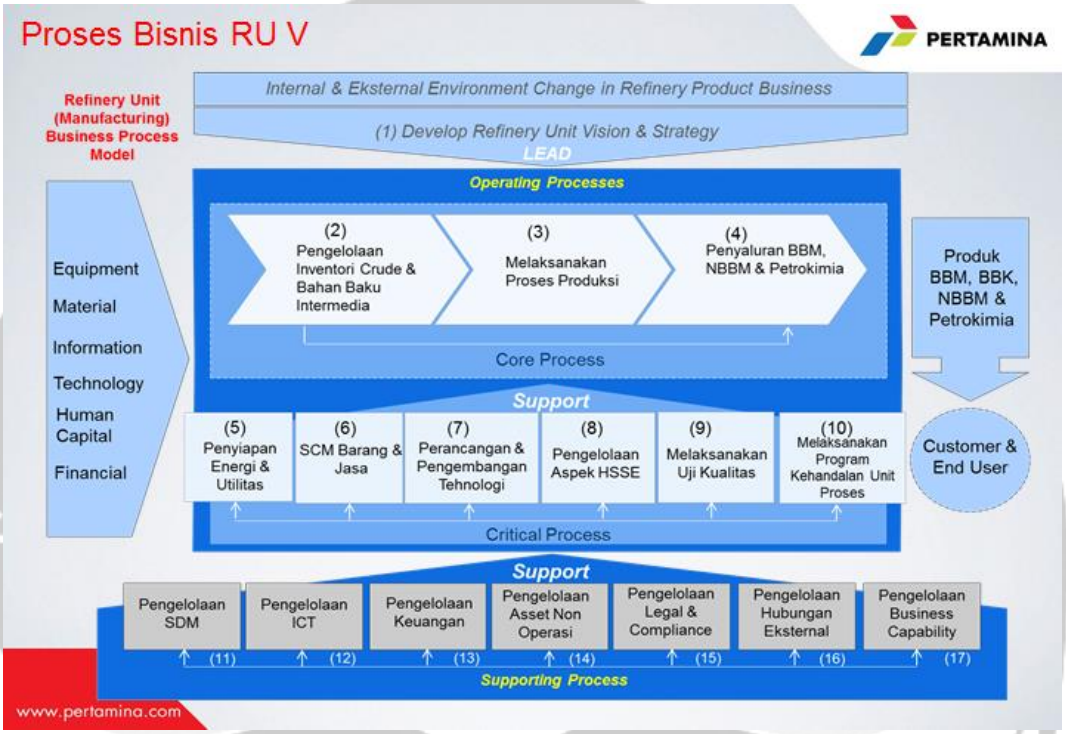


Figure 3.1. PT Pertamina RU V Balikpapan Business Process

(Source: PT Pertamina RU V Balikpapan)

3.1.2. Business Process in Refinery Planning and Optimization Function

This function has responsibility to planning refinery process to have maximum margin as the result. In doing production process, planning and preparation are needed to do. This role is taken by RP&O function in the PT Pertamina (Persero) RU V Balikpapan business process. This function has task to do planning and scheduling so that production process can run fluently. Then, this function also does monitoring and evaluating the process so the feedback can be given for the next period. The illustration of RP&O function business process can be seen in the Figure 3.2.

Figure 3.2. Business Process RP&O Function

(Source: PT Pertamina RU V Balikpapan)

3.2. Material and Product

Like another company, system production in RU V Balikpapan is a resource processing activity to have needed products as the result. PT Pertamina (Persero) RU V Balikpapan included in the make to stock system production. This means this company has rights to determine the products, provide materials, and doing all the process, then the customer will buy products with the deal specification and the price. Operation process in the RU V Balikpapan is running continuously in 24 hours.

3.2.1. Raw Material

In doing production process, PT Pertamina (Persero) RU V Balikpapan uses crude oil as their raw material to make products. The sources of crude oil are not just from domestic area but also international like Asia and Africa. The sources of crude oil that used by RU V Balikpapan can be seen in the Figure 3.3.

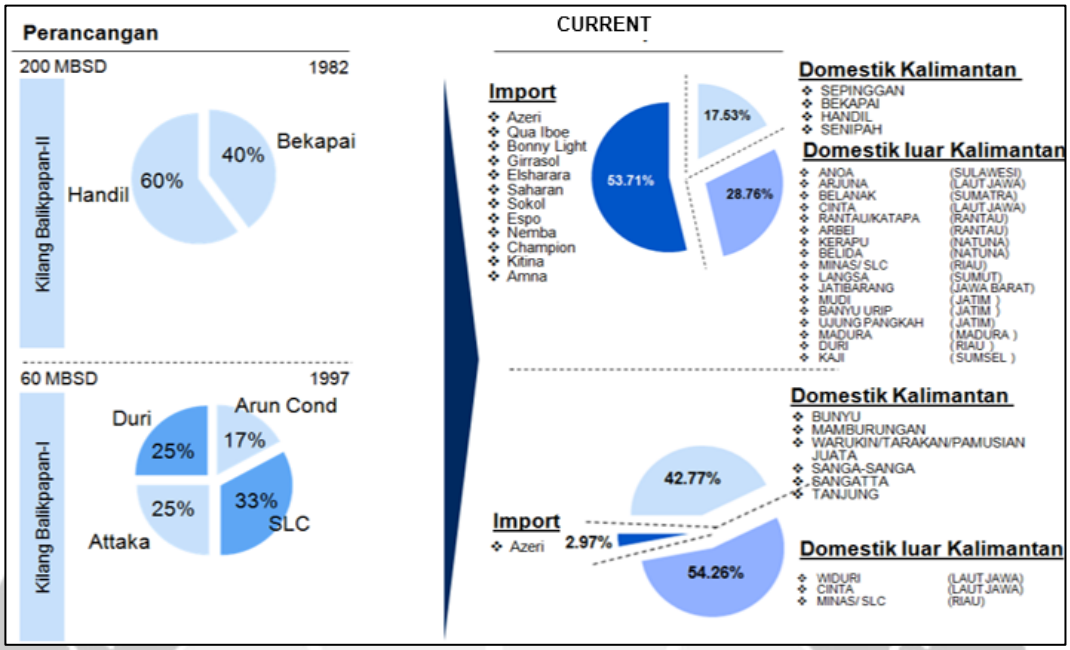


Figure 3.3. Sources of Crude Oil in PT Pertamina RU V Balikpapan

(Source: PT Pertamina RU V Balikpapan)

Crude oil that used is classified into three classes, which are:

a. Light Crude

   This classification of crude oil is processed into Liquefied Petroleum Gas (LPG), light naphtha, and heavy naphtha.

b. Medium Crude

   This classification of crude oil is processed into kerosene and diesel oil.

c. Heavy Crude

   This classification of crude oil is processed into long residue.

Crude oil then processed and blending based on the specification required to make Pertamina's products such as Premium, Pertamax, Pertalite, and Pertadex.

Refinery unit in PT Pertamina (Persero) RU V Balikpapan has capacity up to 260 MBSD which consist of Kilang Balikpapan *I* (60 MBSD) and Kilang Balikpapan II (200 MBSD). Kilang Balikpapan I used to accommodate crude oil from Tanjung pipeline and domestic crude oil carried out by tanker ship. Kilang Balikpapan II is used to accommodate Chevron pipeline and import crude oil. This based on the capacity that each refinery unit have. Illustration for acceptance of crude oil in refinery unit Balikpapan can be seen in the Figure 3.4.

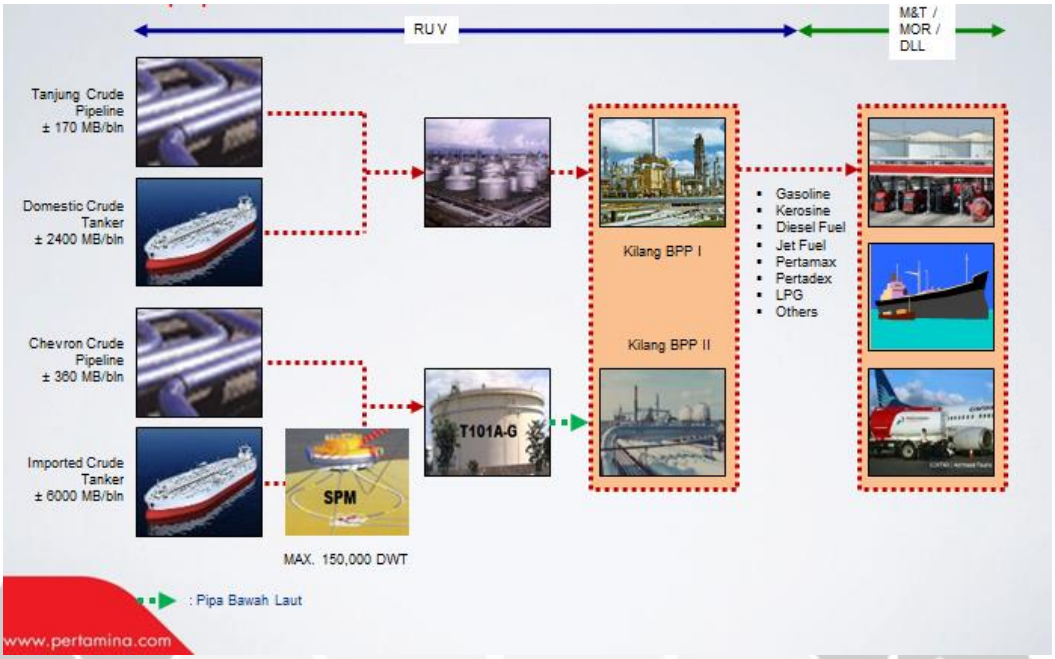


Figure 3.4. Acceptance of Crude Oil in Refinery Unit V Balikpapan

(Source: PT Pertamina RU V Balikpapan)

The acceptance of import crude oil in Kilang Balikpapan II uses large capacity tanker ship, while jetty that provided in Balikpapan can just accommodate for maximum 35,000 DWT (Dead Weight Tonnage), so the port system of large capacity tanker ship is done in single point mooring (SPM) to then flown into Terminal Lawe Lawe. Illustration of SPM system can be seen in the Figure 3.5.

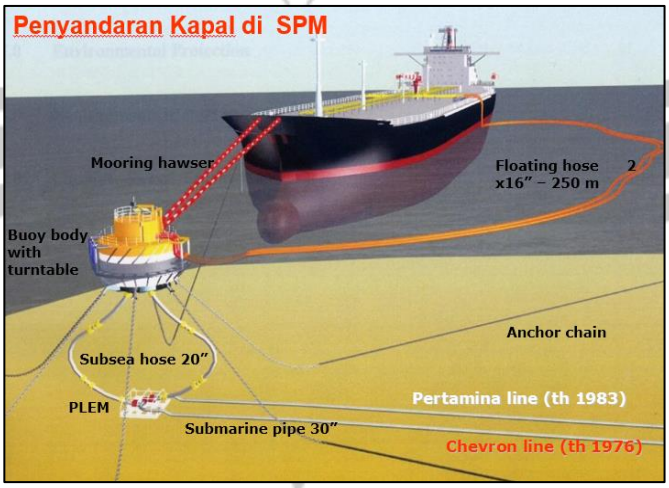


Figure 3.5. Single Point Mooring System in RU V Balikpapan

(Source: PT Pertamina RU V Balikpapan)

Terminal Lawe Lawe is the area used to accommodate crude oil owned by PT Pertamina (Persero) RU V Balikpapan. This terminal is located on Lawe Lawe,

Penajam Paser Utara, East Borneo, and 20 km away from southwest side of Balikpapan. Crude oil that discharged in SPM is flown into Terminal Lawe Lawe by undersea pipeline for 10 km far then continued by land pipeline for 7 km. The capacity of each tank in Lawe Lawe is reached to 800 MB, then this crude oil is processed and flown into Kilang Balikpapan as the cocktail crude (mixed crude oil). This cocktail crude flown into Kilang Balikpapan by land pipeline for 15 km to Penajam then continued by undersea pipeline for 4.6 km. The illustration of crude oil flown through SPM can be seen in the Figure 3.6.

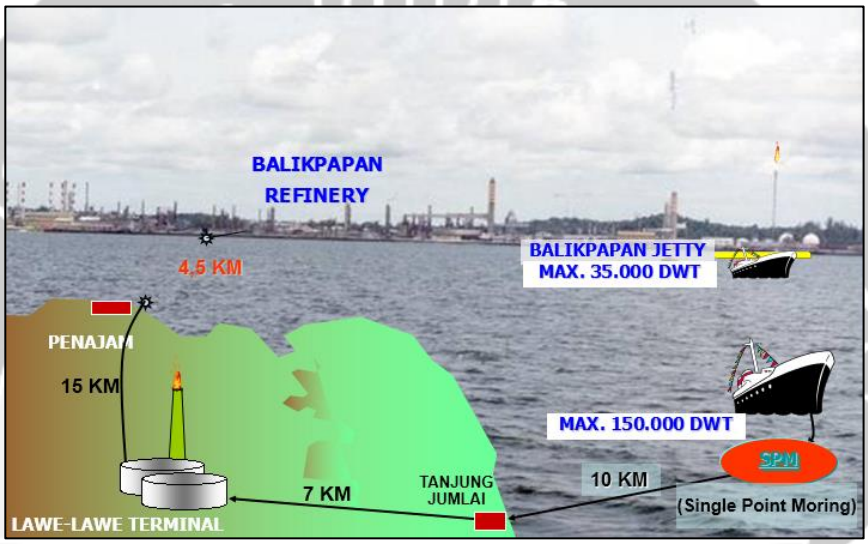


Figure 3.7. Crude Oil Flown through SPM

(Source: PT Pertamina RU V Balikpapan)

3.2.2. Product

Final products as the result of process in PT Pertamina (Persero) RU V Balikpapan will be explained as followed:

a. Premium

Premium is a distillate fuel oil with multiple fraction components. In general, Premium is used for vehicles like cars and motorcycles. This fuel oil is also known as motor gasoline or petrol.

b. Pertalite

Pertalite is the new product of fuel oil with the level of research octane number (RON) 90. Pertalite makes the combustion of vehicles engines with the latest technology is better than Premium which has RON 88. Pertalite is suitable for two-wheeled vehicles to medium-size with multiple vehicles.

c. Kerosene

Kerosene (or in Indonesia known as *minyak tanah*) is fractional distillate fuel from petroleum. This product is a hydrocarbon fluid which has no color and very flammable.

d. Solar

Solar is a medium size distillate fuel oil with the higher boiling point than Premium. The main parameters are volatile, heating value, ignition quality (cetane number), viscosity, and sulfur content. Solar is also known as gasoil or high speed diesel (HSD).

e. Industrial Diesel Oil / Marine Diesel Oil

IDO/MDO is a blending fuel oil from light distillate fraction and heavy residue fraction, has dark color, and low pour point. In example, IDO/MDO product in RU V Balikpapan is the blending from 95% solar and 5% residue. This product is used for diesel machine fuel with low until medium rotation (300 – 1000 RPM) in industry, ship activities, and used as fuel for furnace. This product is also known as Marine Diesel Fuel (MDF).

f. PertaDex (Pertamina Diesel Extra)

PertaDex is a fuel from stream oil fractionation process unit such as Diesel Stripper in HCU, Heavy Kerosene from HCU and LGO from CDU V, so can meets the specification for high grade solar. This product is a modern diesel machine fuel which meets EURO III standard. PertaDex has high performance value with cetane number for more than 53, high quality with sulfur contains lower than 300 ppm, and recommended for new technology of diesel machine (Diesel Common Rail Injection), so the fuel consumption is more economic and has bigger power as the result.

g. Avtur (Aviation Turbine Fuel)

Avtur, or internationally known as Jet A-1, is a fuel from crude fractionation and used as the aviation fuel oil such as airplane with turbine machine and also used as external fuel. Avtur has freezing point of -47^0C and flash point minimum of 38^0C (100^0F).

h. Marine Gas Oil (MGO)

MGO is a distillate fuel oil which used for compression machine ignition where the quality of ignition showed in cetane number. The higher cetane number means that the diesel fuel is more flammable. In general, MGO is used as fuel for all diesel machines with high rotation (above 1000 RPM).

MGO is used for ship activities in subtropical climate and cold climate with the sea temperature reach until -5^{0}C. This product ensures the ship that going through this temperature will have good combustion performance so the fuel is not freezing.

i. Low Aromatic White Spirit (LAWS)

LAWS is a chemical solvent with the low aromatic hydrocarbon component which has boiling point of 140^0 - 200^{0}C. This product has a clear color, high quality, not corrosive, and stable.

j. *Smooth Fluid* 05

SF-05 is a hydrocarbon product that used as base oil in the drilling mud type Oil Based Mud (OBM) blending. This product is used as the blending component because of its best environmentally characteristic and performance.

k. Long Sulphur Waxy Residue (LSWR)

LSWR is a heavy product as a short residue form which injected with flux oil to decreasing viscosity level in order to meet the specification. This product then can be continued processed into fuel oil products.

l. Liquefied Petroleum Gas (LPG)

LPG or in Indonesia known as its brand ELPIJI is a hydrocarbon gas product from oil refinery and gas refinery with the main components of propane gas and butane (C_4H_{10}). In the atmospheric pressure LPG is in the form of gas, but to make it easier to distribute the form of LPG is transformed into liquid. In the form of liquid, LPG is easier to be transferred in tanks or tubes. In Indonesia, LPG is used as the fuel to cook. Consumer of LPG is varying from the households, commercials such as restaurant and hotel, also industrials. In industrial field, LPG used as the fuel in the food industries, ceramic industries, and also the fuel for forklift activities. And also, LPG can be used as fuel in the aerosol industries and as the environmentally refrigerant.

Octane number is a number that shows how much pressure can be given before the fuel burns spontaneously and the level of ignition in the engine when it is fired in the internal cylindrical combustion engine. In the engine, mixture of gas and fuel (in the form of gas) pressured by piston until the minimum volume and the burned by sparks which resulted from plugs. Because of this pressure, the mixture of gas and fuel can be burned spontaneously before the plugs results sparks. If this mixture is burned because of highly pressure (not from the sparks)

then knocking in the engine will happen. This knocking will cause engine become easily damaged, so it must to be avoided. To avoid this thing, then each specification of engine has its specification of octane number.

It was name after octane number because from the entire molecule component for fuel, octane has the best compression properties. Octane component can be compressed until the minimum volume without getting spontaneous burned, unlike heptane that can easily burned even from the small pressure.

Octane number for a fuel that is known internationally called as Research Octane Number (RON). RON determined through the ratio component variable test by filling the fuel in the machine with the regular condition. RON value is achieved by comparing the mixture of iso-octane and n-heptane, for example a fuel with RON of 88 means that 88% of the component is iso-octane and 12% of the component is n-heptane.

3.3. Production Process

In the crude oil processing, there are two main processes done by PT Pertamina (Persero) RU V Balikpapan which will be explained as follow:

a. Primary Process

   Primary Process contains as crude distillation process and vacuum distillation process. Crude distillation is a heating treatment and crude separating process by using boiling point in the atmospheric pressure as its base. This process is done in Crude Distillation Unit IV (CDU IV). In this process, the mixture of crude oil is transformed into many kinds of oil, such as Liquefied Petroleum Gas (LPG), light naphtha, heavy naphtha, kerosene, Light Gas Oil (LGO), Heavy Gas Oil (HGO), and long residue which is the oil that has highest level of boiling point. Vacuum distillation is a large hydrocarbon molecules decomposition process into smaller compounds.

b. Secondary Process

   This process is a continuously process from the primary process, in where long residue that resulted from High Vacuum Unit II (HVU II) using vacuum pressure to make Light Vacuum Gas Oil (LVGO), High Vacuum Gas Oil (HVGO), and short residue. Then HVGO resulted from HVU II and Hydrocracker Unit (HCU) is added with the hydrogen compound from Hydrogen Plant. The last process is oil blending based on the preference composition to make the products needed.

Process production illustration in PT Pertamina (Persero) RU V Balikpapan can be seen in Figure 3.7.

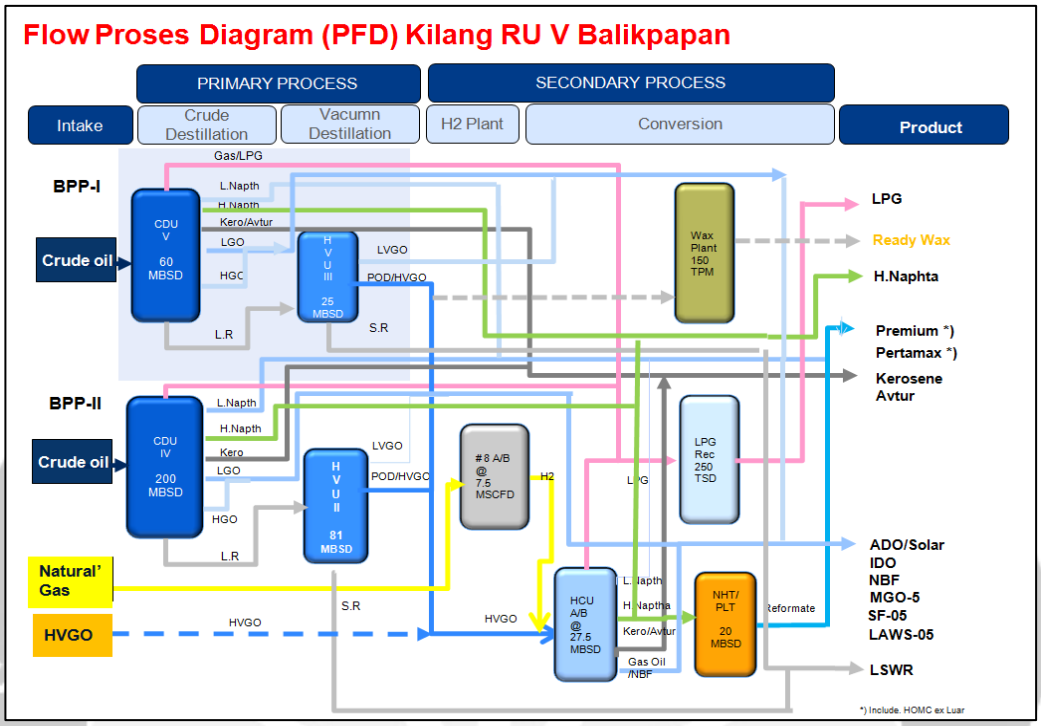


Figure 3.7. Process Production in PT Pertamina (Persero) RU V Balikpapan

(Source: PT Pertamina RU V Balikpapan)

As it is explained in the previous chapter, production function is separated into some production units. Production units in PT Pertamina (Persero) RU V Balikpapan, and also the production process happened in each unit, will be explained as follow.

3.3.1. Production Process in Kilang Balikpapan I

Unit process in Kilang Balikpapan I will be explained as below:

a. Dehydration Plant (DHP)

Some of the crude oil has wax as its composition, so that in the delivery this crude will be suspended with water up to 37% of its volume, this action is taken to avoid the frosting in the transfer process. This unit then has function to remove the water content in the crude until less than 0.5% of its weight.

In the beginning, suspended crude oil is flown through the mine line and added with demulsifier. Demulsifier is anti-emulsion which used to separated water content and the oil content. Then, crude oil is heated with the temperature 50^0 – 60^0C in the Heat Exchanger. Crude oil then flown to the flare through the wear demister to release the contained gas. There is a filter

in the wear demister that will hold the oil to get into flare. After that, crude oil is flown into the stabilizer to release the remaining contained gas. The remaining gas then going into the knock out which the function is to keep the pressure inside the stabilizer by removing the contained gas if the pressure in the stabilizer is too high. Afterwards, the crude oil is flown into the tanks in the Oil Movement area.

b. Crude Distillation Unit V (CDU V)

   CDU V function is to separating the crude oil based on its boiling point in order to make products such as LPG, light naphtha, heavy naphtha, kerosene, light gas oil, heavy gas oil, and long residue. Feed that used is the paraffinic crude oil which some of the result can be used as the material in wax processing.

c. High Vacuum Unit III (HVU III)

   This unit has function to process long residue into some products such as paraffinic oil distillate (POD), light vacuum gas oil (LVGO), high vacuum gas oil (HVGO), and short residue. Process in this unit is the vacuum separation with the pressure 40 mmHg in order to decreasing boiling point. By this action, then long residue can be controlled decomposed and resulting as the needed products.

d. Effluent Water Treatment Plant (EWTP)

   In this unit, the remaining water from Kilang Balikpapan I, liquid waste produce from Kilang Balikpapan II, and the rainwater discharge is being processed. This unit has function to decreasing the level of oil composition, as well as the other compounds, until the meet the safety standard that has been settled by the government before it is flown into the sea. In this unit, the waste is flown into the stilling zone to separate the oil component using oil skimmer and buffle. There is self-cleaning wax at the upper side of stilling zone which is used to hold the wax contained. After that, the oil content from stilling zone is flown into the recover slop sump, the settling sludge is flown into the sludge removal pipe, and the water is flown into the gravity separator.

3.3.2. Production Process in Kilang Balikpapan II

Production process in Kilang Balikpapan II is separated into two complex operations which are Hydroskimming Complex (HSC) and Hydrocracking

Process (HCC), in where each operation contains of some plants. HSC process and its plants are explained in below:

a. Crude Distilling Unit IV (CDU IV)

   As the explanation in CDU V before, CDU IV has function to separate the fraction based on its boiling point in the atmospheric pressure. CDU IV is designed for crude oil processing from Handil and Bekapai.

b. Naphtha Hydrotreater Unit (NHT)

   NHT is the catalyst unit process that use hydrogen gas to decompose organic sulfur, nitrogen compound, oxygen, organometallic and the other saturated organic contained in the hydrocarbon. This unit removes the catalyst poison in the naphtha which will going into the platforming unit.

c. Platforming Unit

   This unit is design to make some hydrocarbon molecules that can be used as catalyst machine fuel in the boiling range of naphtha and resulting blending component with the higher octane number. Feed that used is sweet naphtha which is a feed that has been removed from impurities (mainly sulfur) using naphtha hydrotreating process unit which then flown into the reactor.

d. LPG Recovery Unit

   Feed used in this unit is blending 7.9% from debutanizer platformer, 12.8% from debutanizer hydrocracker, and 79.3% from CDU. This unit is used to process blended gas which is flown into the fuel gas system and blended with the off-gas from the other units before it is used as fuel gas.

e. Sour Water Stripper Unit

   This unit is used to remove hydrogen sulfide and ammoniac of the waste from CDU IV, HVU II, HV Unibon Unit, NHT, and LPG Recovery Unit. Processed water will have a specification that can be re-used in the desalting process in CDU IV and also can be used as the injected water in HC Unibon Unit to avoid the sedimentation of salt in the Heat Exchanger.

HCC is the area to for the secondary process. In this unit cracking process from vacuum distillation products with the help of hydrogen gas resulting from hydrogen plant. Unit process in HCC will be explained as below:

a. High Vacuum Unit II (HVU II)

   HVU II is the unit process that used to process long residue which cannot be fractionated in the CDU. In this unit, distillation process happened in the

vacuum pressure. This action taken as the purpose to decreasing boiling point of long residue, if the boiling point is high then the distillation in the atmospheric pressure will acquire very high temperature. High temperature is avoided in the distillation, because it will cause unwanted cracking.

b. Hydrocracker Unibon (HCU)

This unit has function to process heavy fraction into a product that have economically value. Heavy fraction processed in this unit is HVGO which come from HVU II and HVU III. Process happened in catalyst reaction which needs hydrogen to convert constituent from high molecule crude oil into an economically product that has low molecule such as naphtha, kerosene, and solar. Feed used is HVGO resulting from HVU II and vacuum distillation unit, and other feed used is filter oil from wax plant. Hydrocracking process needs 236 Nm^3/h of hydrogen in every 1 m^3 feed of HVGO used as the support in the process. Hydrogen that used in HCU reacts simultaneously in sulfur hydrocacking also reacts simultaneously in removal of sulfur content, nitrogen content, oxygen content, and sedimentation of olefin. Hydrocracking reaction is a catalyst reaction which has double function as acid activity and also hydrogenation-dehydrogenation activity.

c. Hydrogen Plant

Feed used in this unit is a blended nature gas from Vico and Unocal. This unit has function to provide hydrogen gas mainly used in HCU. Reaction principal used in this unit is reforming reaction which reacts nature gas with steam to result as hydrogen.

d. Flare Gas Recovery Plant

Feed of this unit is off-gas where all of the exceed gas will be burned into flare gas stack. This unit processes the gas into LPG and fuel gas then the residue will be flown into flare gas stack. After that, flare gas will be flown into compressor to be compressed and cooling up to 42^0C using sea water. Compression process is done twice and the result will be returned into LPG separator. LPG in the form of liquid resulting from compression then flown into the stabilizer in CDU IV to be processed into LPG products and gas resulting from separator will be returned became fuel gas. The residue then will be flown into the water seal drum.

e. Hydrogen Recovery Plant

Feed used in this unit is low pressure separator (LPS) off-gas resulting from HCU. This unit has function to process resulting LPS gas into hydrogen with purity of 98%.

3.4. Production Facilities

Production facilities provided in PT. Pertamina (Persero) RU V Balikpapan can be seen in the Table 3.1.

Table 3.1. Production Facilities in PT Pertamina (Persero) RU V Balikpapan

Facilities	Function	Number of Unit	Capacity
Crude Oil Tanks	Tanks to accommodate crude oil	30	7326 MB
Products Tanks	Tanks to accommodate of products	74	5502 MB
SPM	Area for big scale tanker ship to port	1	150.000 DWT
Jetty	Area for tanker ship to port for loading and discharge activities	8	Max 35.000 DWT

CHAPTER 4
STUDENT'S OCCUPATION OVERVIEW

In this chapter will be explained about student's scope of works, responsibilities, and authorities in doing works. Task given for the students will be explained, include methodology and the results of task also explained in this chapter.

4.1. Scope of Works

Internship is done in Supply Chain and Distribution division at PT Pertamina (Persero) RU V Balikapan. This division is a sub-function from Refinery Planning and Optimization Function in which this division is led by a section head and has some staff, included administrative staffs, as shown in the Figure 4.1.

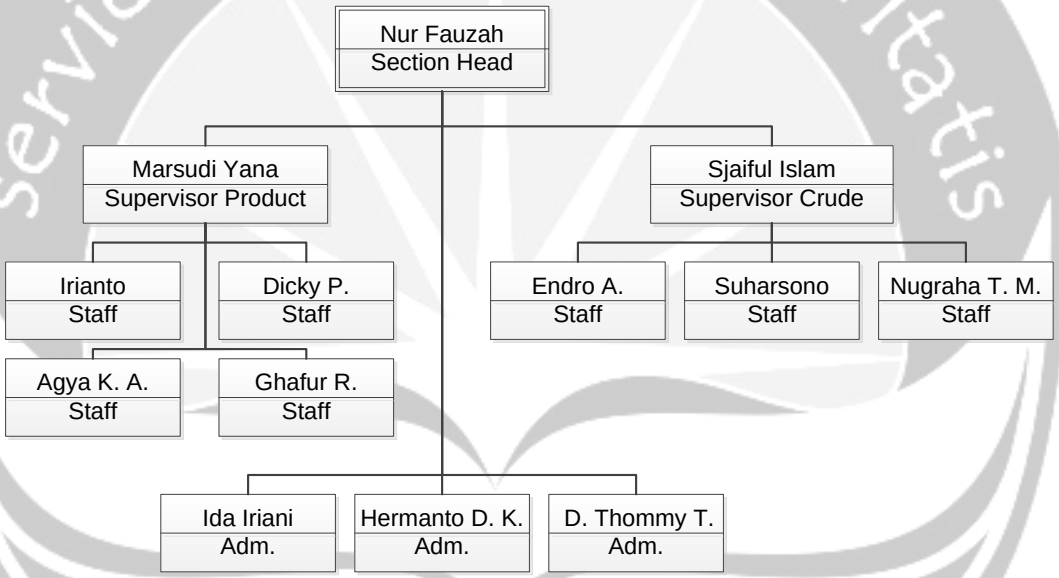


Figure 4.1. Organization structure of Supply Chain and Distribution section PT Pertamina (Persero) RU V Balikpapan in 2017

(Source: PT Pertamina RU V Balikpapan)

Supply Chain and Distribution division has authority to managing, coordinating, planning, arranging, directing and evaluating all the scheduling crude oil processing activities and also the products in order to optimize the usage in the refinery process and also blending process of crude oil, BBM, and non-BBM. This division has responsibility to:

a. Prepare the material for process unit, BBM products and non-BBM products economically, punctually, in the right amount, quality with the respect to effective and efficient.

b. Daily processing planning for refinery units, also coordinating with the related function in order to run the process business smoothly and contributing in guarantee the refinery capability in order to reach maximum margin.
c. Evaluating and executing all activities in optimization facilities and scheduling.

Specifically, tasks in Supply Chain and Distribution division are explained as below:

a. Predict the stock of crude oil, intermedia material, and product monthly, weekly, and daily.
b. Coordination of Refinery Planning and Optimization function about allocation of crude oil and intermedia material.
c. Make daily planning report, or known as *Rencana Pengolahan Harian* (RPH)
d. Arrange the schedule of crude oil, intermedia material, and products.
e. Arrange the composition in crude oil and products blending.

4.2. Responsibilities and Authorities

Every student that does internship in PT Pertamina (Persero) RU V Balikpapan is required to come on the date that has been settled by the company. In this case, internship is done from 4th of September 2017 until 31st of October 2017. Every student that does internship must have ID badge and done the safety induction which held and cleared up before the first date of internship. However, because the respond letter from HR division of PT Pertamina (Persero) RU V Balikpapan is received on Thursday, 31st of August 2017 and on the Friday is a national holiday then safety induction and administration of badge is done on 4th of September 2017 while the internship is started on the following day. The students that already have badge and done the safety induction have access to all the area in the company and equipped with safety wear if the student come inside the refinery area. Student that does the internship is obligated to follow all the regulations and policies in the office area or even more in the refinery area. Workhours for students follow workhours that settled for the employee in PT Pertamina (Persero) RU V Balikpapan.

Internship student is settled a schedule for the activity by the division that must be followed by the student diligently. In this case, for the first week of internship, the students get the chance to join the activities in all unit of PT Pertamina (Persero) RU V Balikpapan. This chance enables the student to have a brief

explanation about overview of the company and also the relation of each unit in the business process. Then on the following week, the student is placed into the pointed division which is in this case is Supply Chain and Distribution division. In the division, students will doing assignment given by the advisor. The activities will be discussion, doing the assignment, and report making.

Assignment given by the advisor is to give additional features using solver in their excel program that has been used by their staff. In doing the activities, this division mostly use Microsoft Excel as the supporting program. Their excel worksheet have been modified that enabled them to input the data faster and accurate. The program given for this internship task is an excel program for blending simulation in Terminal Lawe Lawe. This program is used to determine the percentage of blending from three tanks or even four tanks. Currently the staff will determine manually the percentage until it nearly the specification result percentage of light, medium, and heavy crude, excel program will calculate the result percentage. With the additional of this features then it is hoped that the percentage of the blending can automatically calculated.

Rights and authorities that a internship student has in PT Pertamina (Persero) RU V Balikpapan are explained as below:

a. Students have rights to do observation in the system
b. Students have rights to get the data needed, as long as the data is not classified as the private data for company.
c. Students can communicate with all the workers, asking question, and given an advisor.
d. Students can use the facilities provide by the company.

4.3. Methodology

This section will contains all the sequences in doing given assignment thus the objectives can be achieved as the result. Firstly, started from the background of the given assignment where the advisor and the related staffs give brief explanation about the existing condition, while the students directly observed the program used. Then problem identification was done by doing discussion with the advisor and related staff so that the objective is defined. Literatures review was done by the student with the advisor guidance. Therefore problem solving was done by the making process of intended features in the program so that the objective can be achieved as the result. All the works that have been done then

being documented in the internship report. Methodology of work implementation can be seen in the Figure 4.2. below.

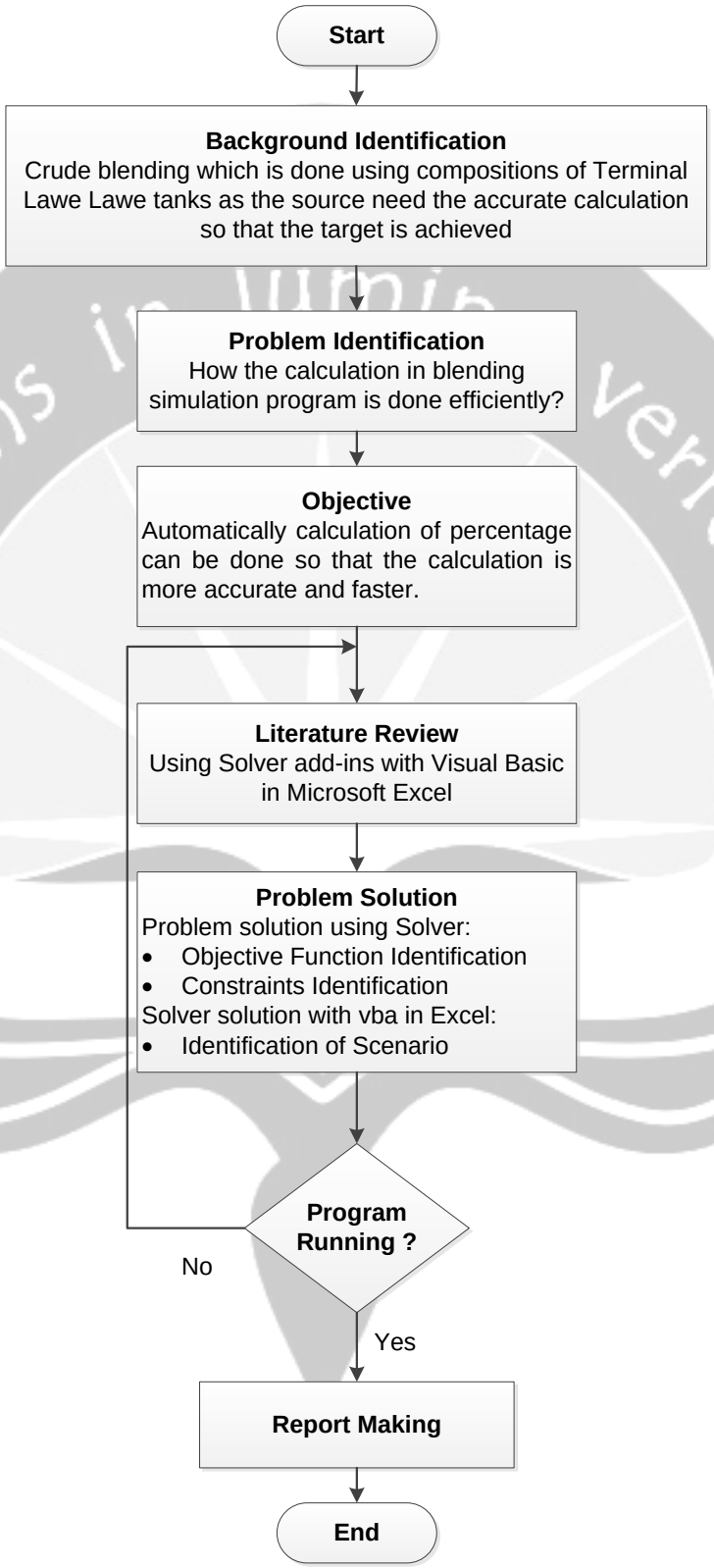


Figure 4.2. Methodology of work implementation

4.4. Result

Existing condition as the background of the problem and result of the assignment will be explained as below.

4.4.1. Existing Condition

Program that used to do the simulation for blending composition in Terminal Lawe Lawe tanks is Microsoft Excel. This program is used to know the percentage of each tank that will be used if the company wants to have certain value of the compositions result. The worksheet has been equipped with the formulas to make easier for the staff when inputting the data. There are three scenarios which are blending simulation for 2 tanks, 3 tanks, and 4 tanks as the source. The worksheet that used can be seen in the Figure 4.3.

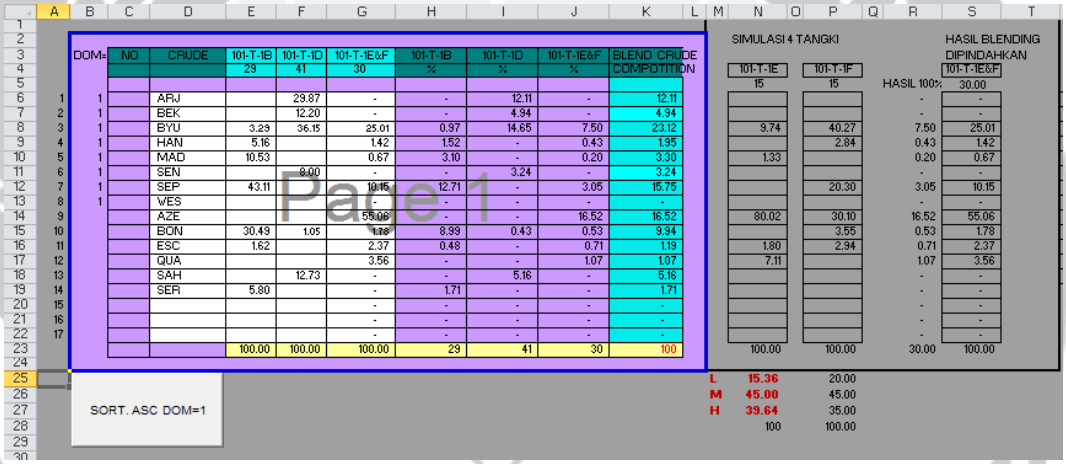


Figure 4.3. Existing condition of Excel worksheet for blending compositions simulation

Blending simulation for 2 tanks is the simulation which is used 2 tanks from Terminal Lawe Lawe as the source. For each simulation there will be inputting data process for the tank used and the crude compositions. Tank used is inputted in the third row started from column E and written as “101-T-1B” for the example. This is adjusted with name of the tank used. Crude compositions in the tank are inputted in the “CRUDE” column and inputted just as the initial of the crude such as “ARJ” for Arjuna and “BEK” for Bekapai. Information about percentage of compositions for each crude are inputed in the column E and F. Inputting process for compositions of 2 tanks can be seen in the Figure 4.4.

	A	B	C	D	E	F
2						
3		DOM=1	NO	CRUDE	101-T-1B	101-T-1D
4					50	50
5						
6	1	1		ARJ		29.87
7	2	1		BEK		12.20
8	3	1		BYU	3.29	36.15
9	4	1		HAN	5.16	
10	5	1		MAD	10.53	
11	6	1		SEN		8.00
12	7	1		SEP	43.11	
13	8	1		AZE		
14	9			BON	30.49	1.05
15	10			ESC	1.62	
16	11			QUA		
17	12			SAH		12.73
18	13			SER	5.80	
19	14					
20	15					
21	16					
22	17					
23					100.00	100.00
24						

Figure 4.4. Inputing process of blending compositions for 2 tanks

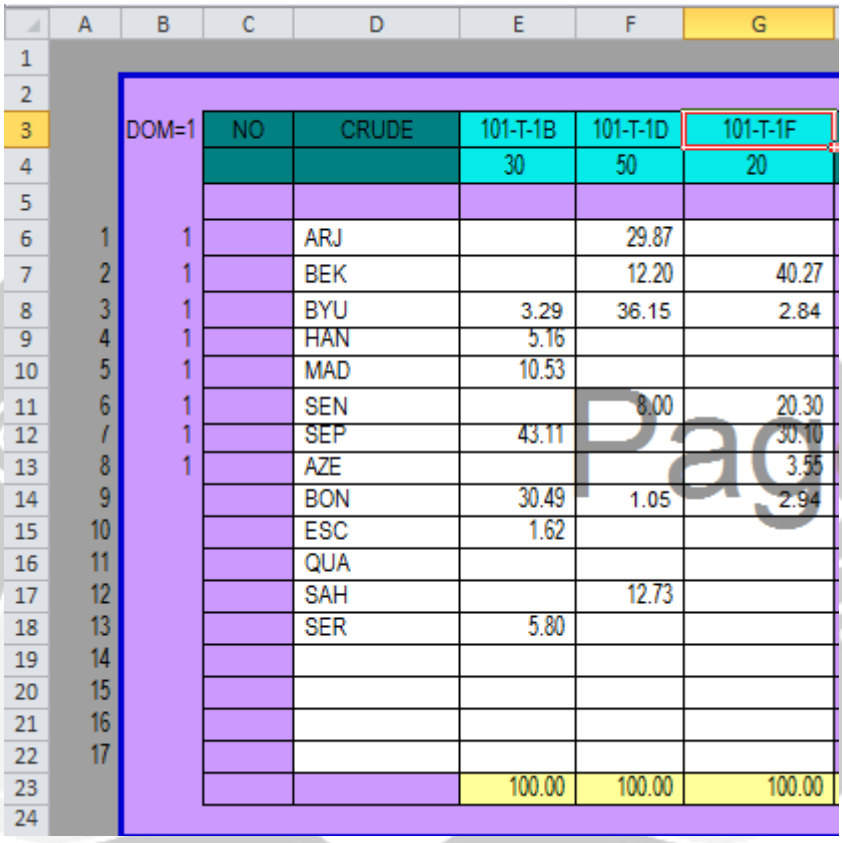
At the fourth row of column E and F are inputted as the blending percentage for each tank. In this case tank B inputted as 50% and tank D as 50% as the example. After the blending percentage is inputted then the result of “L”, “M”, “H” percentage will be calculated automatically as seen in the Figure 4.5.

L	21.11	20.00
M	59.17	45.00
H	19.72	35.00
	100	100.00

Figure 4.5. Percentange result of blending crude compositions

“L”, “M”, “H” here are the representative of light crude, medium crude, and heavy crude that resulted from the data inputted. These are the main result of the simulation. The red color font in the right column represents the result of simulation and the black color font represents the target desired. The inputting process of blending percentage for each tank will be repeated until the result of “L”, “M”, “H” percentage match or close to the target.

Inputting process for blending simulation for 3 tanks are the same with the simulation of 2 tanks, the difference is that in this simulation 3 tanks are used as the source.

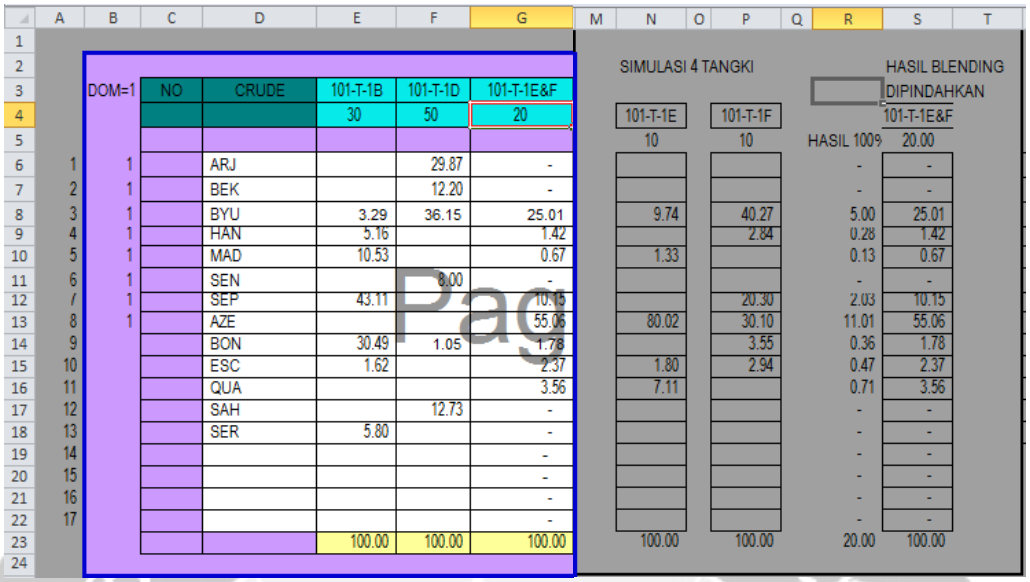


	A	B	C	D	E	F	G
1							
2							
3		DOM=1	NO	CRUDE	101-T-1B	101-T-1D	101-T-1F
4					30	50	20
5							
6	1	1		ARJ		29.87	
7	2	1		BEK		12.20	40.27
8	3	1		BYU	3.29	36.15	2.84
9	4	1		HAN	5.16		
10	5	1		MAD	10.53		
11	6	1		SEN		8.00	20.30
12	7	1		SEP	43.11		30.10
13	8	1		AZE			3.55
14	9			BON	30.49	1.05	2.94
15	10			ESC	1.62		
16	11			QUA			
17	12			SAH		12.73	
18	13			SER	5.80		
19	14						
20	15						
21	16						
22	17						
23					100.00	100.00	100.00
24							

Figure 4.6. Inputing process of blending compositions for 3 tanks

In the figure 4.6. can be seen as example that tanks used for blending are tanks B, D and F followed by the compositions. Blending percentage of each tank are 30, 50, 20, which were this will determine the result of light, medium, and heavy percentage.

Blending simulation for 4 tanks use 4 tanks as the source. There are some differences in inputting process for this scenario. In this case, compositions of the tanks are inputted in the column E, F, N, and P. After column N and P are being filled then it will be automatically calculated as the mixed crude and showed in the column S. The result shown in the column S then will be copied to the column G manually so that the calculation of percentage can be run the same as the previous scenario. This scenario can be seen in the Figure 4.7.



		DOM=1	NO	CRUDE	101-T-1B	101-T-1D	101-T-1E&F
					30	50	20
1	1			ARJ		29.87	-
2	1			BEK		12.20	-
3	1			BYU	3.29	36.15	25.01
4	1			HAN	5.16		1.42
5	1			MAD	10.53		0.67
6	1			SEN		8.00	-
7	1			SEP	43.11		10.15
8	1			AZE			55.06
9				BON	30.49	1.05	1.78
10				ESC	1.62		2.37
11				QUA			3.56
12				SAH		12.73	-
13				SER	5.80		-
14							-
15							-
16							-
17							-
					100.00	100.00	100.00

SIMULASI 4 TANGKI			HASIL BLENDING DIPINDAHKAN
101-T-1E	101-T-1F		101-T-1E&F
10	10	HASIL 100%	20.00
		-	-
		-	-
9.74	40.27	5.00	25.01
	2.84	0.28	1.42
1.33		0.13	0.67
		-	-
	20.30	2.03	10.15
80.02	30.10	11.01	55.06
	3.55	0.36	1.78
1.80	2.94	0.47	2.37
7.11		0.71	3.56
		-	-
		-	-
		-	-
		-	-
		-	-
		-	-
100.00	100.00	20.00	100.00

Figure 4.7. Inputing process of blending compositions for 4 tanks

Same as the previous scenario, the blending percentage of each tank is manually inputted and the process will be repeated until the result is close to the target. The condition where the staff has to input manually the blending percentage and repeat the process have some disadvantages to their work activities, such as:

a. Wasting time to do repeated process
b. Diversity results, because there is a high probability that different staff will input different value that will give different result.

4.4.2. Current Condition

Through this assignment, there are three additional features as the command buttons which are used to calculate the blending percentage automatically with the result match or close to the target. These buttons enabled staff to perform the simulation more efficient. Worksheet for the current condition can be seen in the Figure 4.8. below.

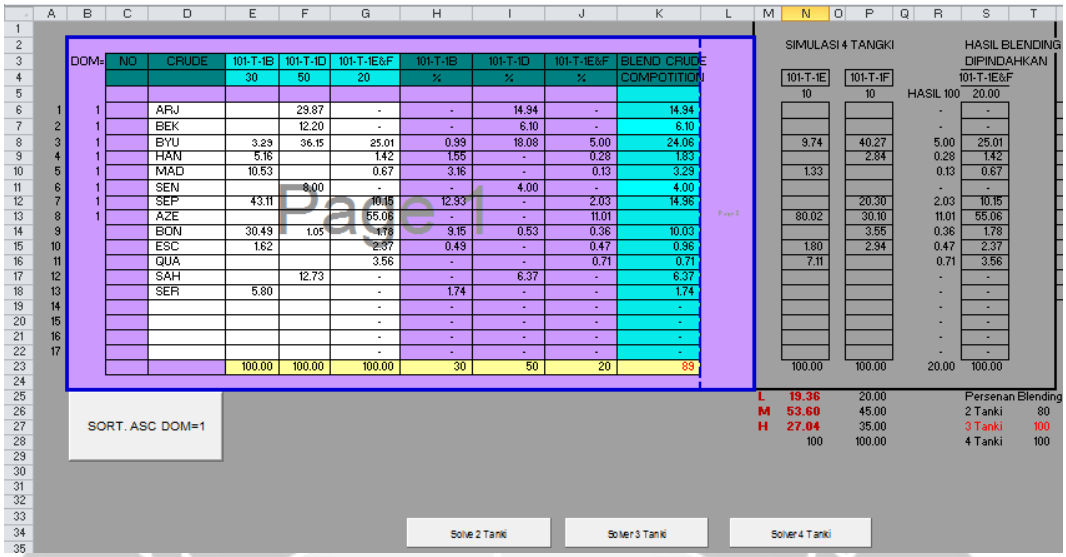


Figure 4.8. Current worksheet condition

These features use visual basic application (vba) which is provided in the Ms.Excel menu. Vba in Excel use some set language code to run the process, this called syntax. This assignment uses some basic syntax in vba and also solver syntax to do the calculation. There are also additional tables which are "Persenan Blending" in the right bottom side that set as the objective function. This table is the sum of blending percentage compositions for each scenario which are the result must be 100% in the scenario used.

Syntax that used for the "Solver 2 Tanki" buttons can be seen in the Figure 4.9.

```
Solver2                                   Click
Private Sub Solver2_Click()
Cells(4, 7).Value = ""
Cells(5, 7).Value = ""
Cells(6, 7).Value = ""
Cells(7, 7).Value = ""
Cells(8, 7).Value = ""
Cells(9, 7).Value = ""
Cells(10, 7).Value = ""
Cells(11, 7).Value = ""
Cells(12, 7).Value = ""
Cells(13, 7).Value = ""
Cells(14, 7).Value = ""
Cells(15, 7).Value = ""
Cells(16, 7).Value = ""
Cells(17, 7).Value = ""
Cells(18, 7).Value = ""
Cells(19, 7).Value = ""
Cells(20, 7).Value = ""
Cells(21, 7).Value = ""
Cells(22, 7).Value = ""
Cells(23, 7).Value = ""
Cells(26, 19).Font.ColorIndex = 3
Cells(26, 20).Font.ColorIndex = 3
Cells(27, 19).Font.ColorIndex = 0
Cells(27, 20).Font.ColorIndex = 0
Cells(28, 19).Font.ColorIndex = 0
Cells(28, 20).Font.ColorIndex = 0
```

Figure 4.9. Syntax used for "Solver 2 Tanki" button

Syntax Cells(4,7).Value = “” used to clear the destined cell when the button is clicked. In the blending simulation for 2 tanks, column used are E and F, so the syntax mentioned before is intended to make data in G column is cleared automatically. Syntax Cells(26,19).Font.ColorIndex used to give the font color for destinated cell. Number “3” is the representative for red color and “0” is the representative of black color. This intended to marked “Persenan Blending” table, so that when the button is clicked then the font color for data in this table will changed depending on the scenario used for the simulation.

Solver syntax is also being used in this button which can be seen in the Figure 4.10. below

```
SolverReset
    SolverOk SetCell:="$T$26", MaxMinVal:=3, ValueOf:=100, ByChange:="$E$4:$F$4", _
        Engine:=1, EngineDesc:="GRG Nonlinear"
    SolverAdd CellRef:="$E$4", Relation:=3, FormulaText:="25"
    SolverAdd CellRef:="$F$4", Relation:=3, FormulaText:="25"
    SolverAdd CellRef:="$N$25", Relation:=2, FormulaText:="$P$25"
    SolverAdd CellRef:="$N$26", Relation:=2, FormulaText:="$P$26"
    SolverAdd CellRef:="$N$27", Relation:=2, FormulaText:="$P$27"
SolverSolve
End Sub
```

Figure 4.10. Solver syntax used for “Solver 2 Tanki” button

SolverReset is used to reset solver add-ins settings to the defaults before defining new problems. If this syntax is not used then the solver add-ins is not being reset and the problem just being added with the previous problem. Data that used as the objective function is data in the “Persenan Blending” table which is represent in the cell T26 where the value must be equal to 100 and blending percentage in column E and F are used as the changing variable. This can be seen in the SolverOk syntax where the SetCell is to define the destined cell as the objective function and the changing variable is stated in the ByChange syntax. Constraint for this scenario is that the minimal blending percentage is 25%, this condition is determined by the advisor in Pertamina in order not to have high range of value as the result of blending percentage for each tank. Other constraint is that the result percentage of “L”, “M”, “H” must be equal to the targeted value. Constrains are set by using SolverAdd and the relation number 3 is represent the relation of “greater than or equal to” and number 2 is represent the relation of “equal to”, this is adjusted with the sequence of relation provided in the solver add-ins as seen in the Figure 4.11. below.

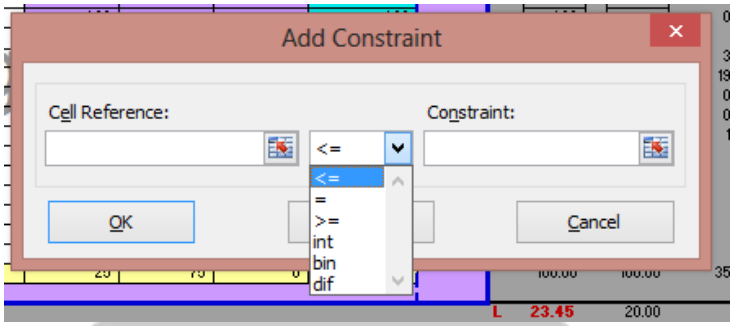


Figure 4.11. Sequence of relation in Solver add-ins

When “Solver 2 Tanki” button being clicked then the blending percentage will be automatically calculated with the result percentage close to the target and data in the G column will automatically erased. Also the font in the “Persenan Blending” table for 2 tanks will change into red. This indicates that the active scenario is the blending simulation for 2 tanks. The scenario of “Solver 2 Tanki” button can be seen in the Figure 4.12.

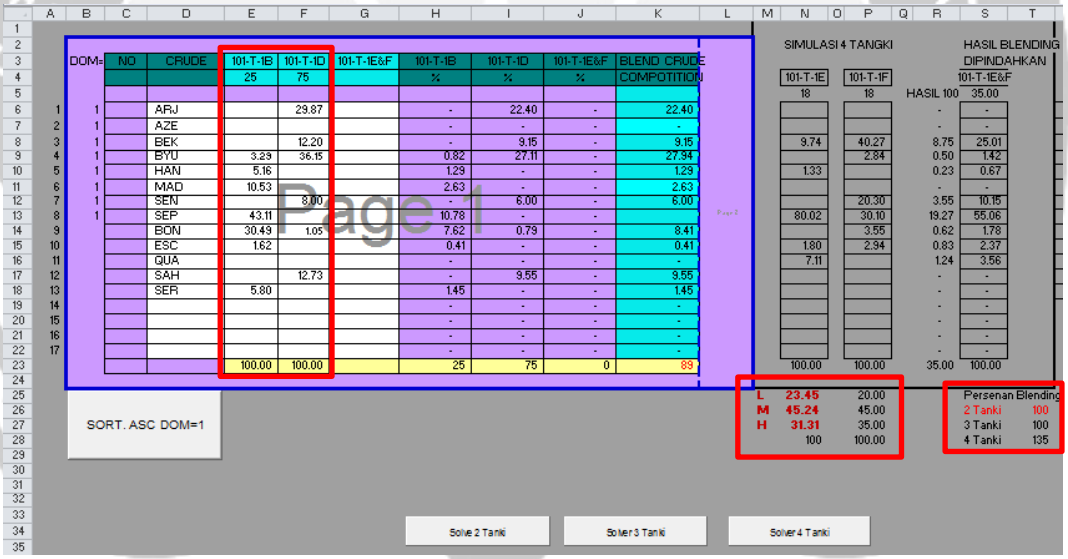


Figure 4.12. “Solver 2 Tanki” button scenario

Syntax that used for the “Solver 3 Tanki” buttons can be seen in the Figure 4.13.

```
Private Sub Solver3_Click()
Cells(26, 19).Font.ColorIndex = 0
Cells(26, 20).Font.ColorIndex = 0
Cells(27, 19).Font.ColorIndex = 3
Cells(27, 20).Font.ColorIndex = 3
Cells(28, 19).Font.ColorIndex = 0
Cells(28, 20).Font.ColorIndex = 0
SolverReset
    SolverOk SetCell:="$T$27", MaxMinVal:=3, ValueOf:=100, ByChange:="$E$4:$G$4", _
        Engine:=1, EngineDesc:="GRG Nonlinear"
    SolverAdd CellRef:="$E$4", Relation:=1, FormulaText:="50"
    SolverAdd CellRef:="$F$4", Relation:=1, FormulaText:="50"
    SolverAdd CellRef:="$G$4", Relation:=1, FormulaText:="50"
    SolverAdd CellRef:="$E$4", Relation:=3, FormulaText:="15"
    SolverAdd CellRef:="$F$4", Relation:=3, FormulaText:="15"
    SolverAdd CellRef:="$G$4", Relation:=3, FormulaText:="15"
    SolverAdd CellRef:="$N$25", Relation:=2, FormulaText:="$P$25"
    SolverAdd CellRef:="$N$26", Relation:=2, FormulaText:="$P$26"
    SolverAdd CellRef:="$N$27", Relation:=2, FormulaText:="$P$27"
SolverSolve
End Sub
```

Figure 4.13. Syntax used for “Solver 3 Tanki” button

Syntax used is the same as the scenario before. When the button is being clicked then font color in “Persenan Blending” table for 3 tanks will change into red, this indicated that the scenario for 3 tanks is being used. Using the same data from this table, the objective function is that the sum of blending percentage from 3 tanks which is shown in T27 cell value must be equal to 100. The blending percentage of 3 tanks in column E, F, and G will be automatically calculated. These columns are used as the changing variable in this scenario. The constraints used are the minimum value of blending percentage is 15% and the maximum value is 50%, also the result percentage of “L”, “M”, “H” must be equal to the target. The scenario of “Solver 3 Tanki” button can be seen in the Figure 4.14.

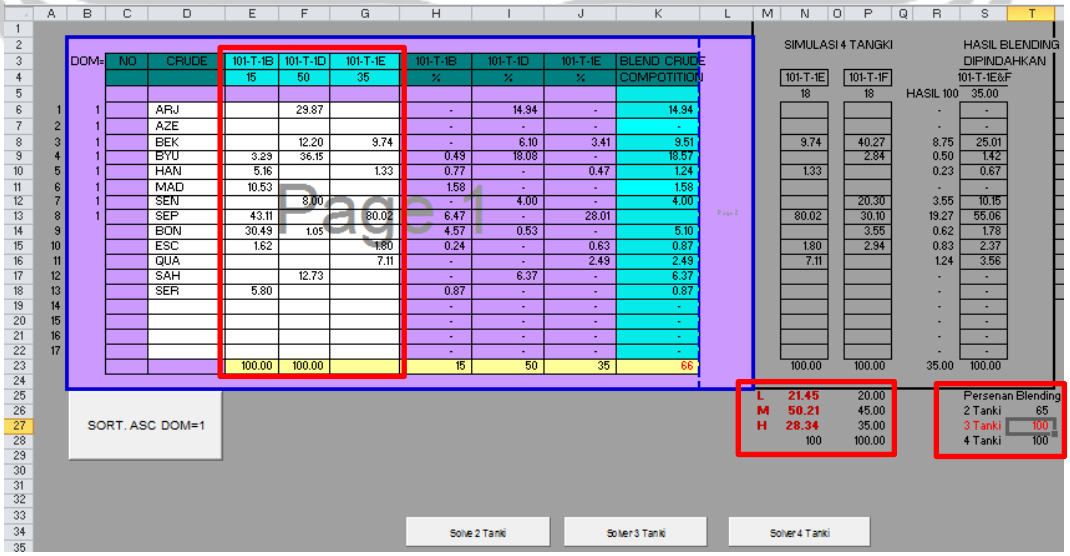
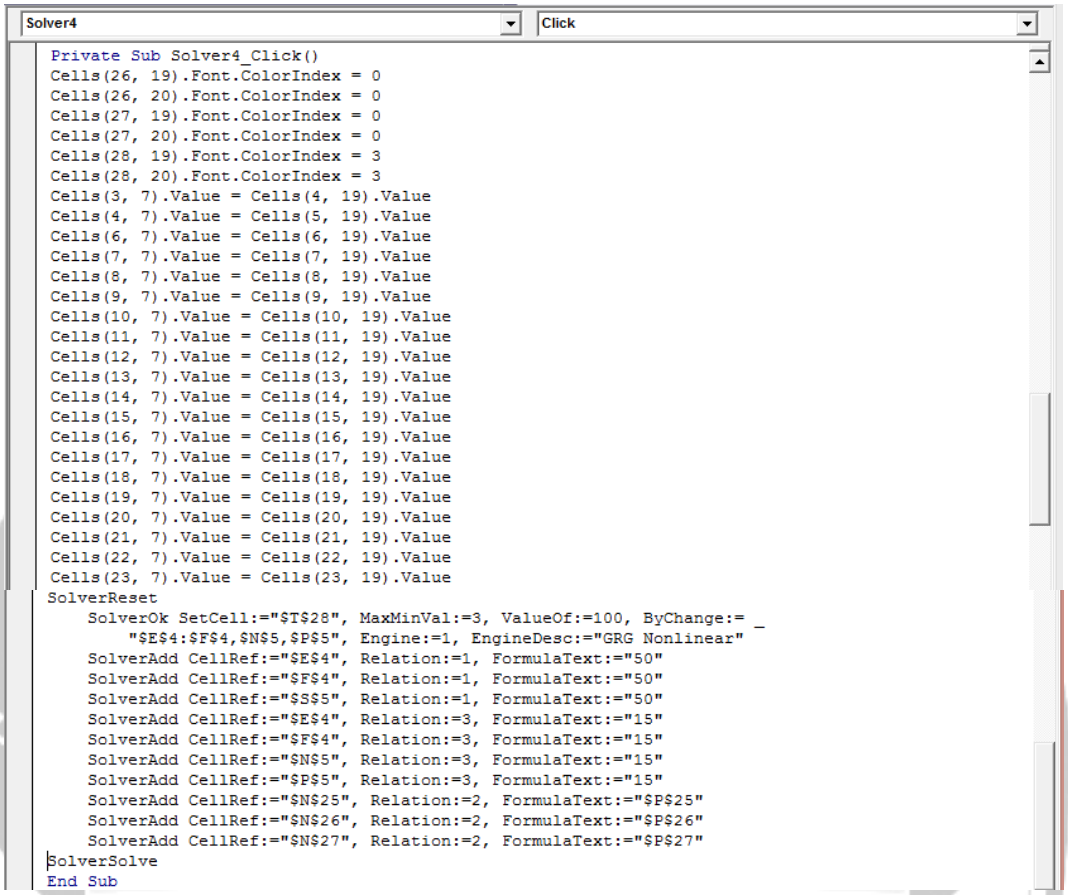


Figure 4.14. “Solver 3 Tanki” button scenario

Syntax that used for the “Solver 4 Tanki” buttons can be seen in the Figure 4.15.



```
Solver4                                          Click

Private Sub Solver4_Click()
Cells(26, 19).Font.ColorIndex = 0
Cells(26, 20).Font.ColorIndex = 0
Cells(27, 19).Font.ColorIndex = 0
Cells(27, 20).Font.ColorIndex = 0
Cells(28, 19).Font.ColorIndex = 3
Cells(28, 20).Font.ColorIndex = 3
Cells(3, 7).Value = Cells(4, 19).Value
Cells(4, 7).Value = Cells(5, 19).Value
Cells(6, 7).Value = Cells(6, 19).Value
Cells(7, 7).Value = Cells(7, 19).Value
Cells(8, 7).Value = Cells(8, 19).Value
Cells(9, 7).Value = Cells(9, 19).Value
Cells(10, 7).Value = Cells(10, 19).Value
Cells(11, 7).Value = Cells(11, 19).Value
Cells(12, 7).Value = Cells(12, 19).Value
Cells(13, 7).Value = Cells(13, 19).Value
Cells(14, 7).Value = Cells(14, 19).Value
Cells(15, 7).Value = Cells(15, 19).Value
Cells(16, 7).Value = Cells(16, 19).Value
Cells(17, 7).Value = Cells(17, 19).Value
Cells(18, 7).Value = Cells(18, 19).Value
Cells(19, 7).Value = Cells(19, 19).Value
Cells(20, 7).Value = Cells(20, 19).Value
Cells(21, 7).Value = Cells(21, 19).Value
Cells(22, 7).Value = Cells(22, 19).Value
Cells(23, 7).Value = Cells(23, 19).Value
SolverReset
    SolverOk SetCell:="$T$28", MaxMinVal:=3, ValueOf:=100, ByChange:= _
        "$E$4:$F$4,$N$5,$P$5", Engine:=1, EngineDesc:="GRG Nonlinear"
    SolverAdd CellRef:="$E$4", Relation:=1, FormulaText:="50"
    SolverAdd CellRef:="$F$4", Relation:=1, FormulaText:="50"
    SolverAdd CellRef:="$S$5", Relation:=1, FormulaText:="50"
    SolverAdd CellRef:="$E$4", Relation:=3, FormulaText:="15"
    SolverAdd CellRef:="$F$4", Relation:=3, FormulaText:="15"
    SolverAdd CellRef:="$N$5", Relation:=3, FormulaText:="15"
    SolverAdd CellRef:="$P$5", Relation:=3, FormulaText:="15"
    SolverAdd CellRef:="$N$25", Relation:=2, FormulaText:="$P$25"
    SolverAdd CellRef:="$N$26", Relation:=2, FormulaText:="$P$26"
    SolverAdd CellRef:="$N$27", Relation:=2, FormulaText:="$P$27"
SolverSolve
End Sub
```

Figure 4.15. Syntax used for “Solver 4 Tanki” button

In this scenario, there is additional syntax which is Cells(3,7).Value = Cells(4,19).Value. that used to give the destined cell the same value as the selected cell. By this function, then the user do not need to copy the data from S column to the G column because G column will be automatically filled the same data as S column when the button is being clicked.

The same situation will be shown when the “Solver 4 Tanki” button is being clicked, which are the font in “Persenan Blending” table for 4 tanks will change into red and it is set as the objective function where the value is equal to 100. The changing variables are the blending percentage in column E, F, N, and P where the minimal value is 15% and the maximum value is 50%. Other constraints also the result percentage should be equal to the target. This scenario can be seen in the Figure 4.16.

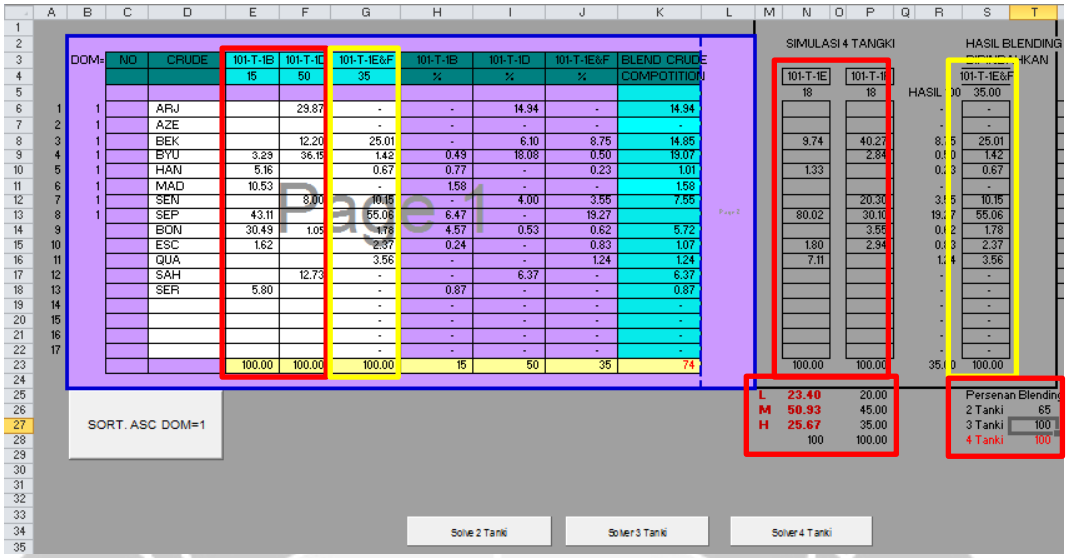


Figure 4.16. "Solver 4 Tanki" button scenario

With these buttons, user just need to fill the data about tanks and the compositions and there is no need to do repeated process to search the desired "L", "M", "H" percentage match as the target. The value of blending percentage will be automatically calculated with the result percentage match or close to the target.

CHAPTER 5
SUMMARY

In doing their business process, PT Pertamina (Persero) RU V Balikpapan has some function units which is one of them is Refinery and Planning Optimization. This function plans the refinery process to gain the maximum margin. One of the tasks in this function is to planning the crude processing and also the production activity to optimize the capacity with the existing condition to have maximum profit. This task mentioned before is one of the tasks for the Supply Chain and Distribution section.

In doing their tasks, staff used some of information system to facilitate them to do works. One of the programs that they used is simulation program for blending composition using Terminal Lawe Lawe tanks as the sources. This program is Microsoft Excel base program where the staff input the data needed then do the simulation to get the blending percentage with the result percentage match with the target. The previous program that has been used is manually determined for the target by the staff. This generate some problems that being the background of this internship program assignment. The result of this internship assignment will make the staff easier to find the optimal blending percentage of the tanks automatically based on the scenario used therefore the simulation can run efficiently without wasting much time.

This assignment used solver to do the optimization for this blending simulation program. In this era, there are many programs that facilitate user to do the optimization problem. Solver is just one of the tools in optimization. This problem can also be solved using another optimization programs.

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Senin, 4 September 2017	07.30	Safety Induction	PT. PERTAMINA REFINERY UNIT V BALIKPAPAN SARLOUT HA. S (PERSERO)
		10.00 - 14.00	Pembuatan Badge dan Koordinasi HR	

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda Tangan & Stempel Perusahaan
	Selasa, 5 September 2017	10.00 - 12.00	Overview KP oleh bag. Supply Chain & Dist	PT PERTAMINA (PERSERO) UNIT V BALIKPAPAN
		13.00 - 16.00	Studi Literatur	

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Rabu, 6 September 2017	07.30 - 16.00	Studi literatur & Diskusi	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Kamis, 7 September 2017	07.30 - 12.00	Orientasi Hydroskimming Complex	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)
		13.00 - 16.00	Orientasi Hydrocracking Complex	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Jumat, 8 September 2017	07.30 - 12.00	Orientasi Oil movement	PT. PERTAMINA (PERSERO) REFINERY UNIT V BALIKPAPAN
		13.00 - 16.00	Orientasi laboratory	

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Senin, 11 September 2017	07.30 - 12.00	Orientasi Ref. Planning	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)
		13.00 - 16.00	Orientasi Budget & Performance	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Selasa, 12 September 2017	07.30 - 16.00	Studi Literatur	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Rabu, 13 September 2017	07.30 - 12.00	Diskusi Tugas Khusus (Penjadwalan Kapal & MMI Sep)	PT PERTAMINA (PERSERO) REFINERY UNIT BALIKPAPAN
		13.00 - 16.00	Studi Literatur	

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Kamis, 14 September 2017	07.30 - 16.00	Studi Literatur & Pengerjaan Laporan Bab 1 & 2	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Jumat, 15 September 2017	07.30 - 16.00	Studi literatur Pengerjaan Laporan Bab 2	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Senin, 18 September 2017	07.30 - 16.00	Studi literatur Pengerjaan Laporan Bab 3	PT PERTAMINA (PERSERO) REFINERY UNIT V BALIKPAPAN

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda Tangan & Stempel Perusahaan
	Selasa, 19 September 2017	07.30 - 16.00	Studi literatur Pengerjaan laporan Bab 3	PT PERTAMINA (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Rabu, 20 September 2017	07.30 - 16.00	Pengerjaan Tugas Khusus	PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda Tangan & Stempel Perusahaan
	Jumat, 22 September 2017	07.30 - 11.30	Studi literatur & Pengerjaan Laporan	PT PERTAMINA (PERSERO) REFINERY UNIT V BALIKPAPAN
		13.30 - 16.00	Pengerjaan Tugas Khusus	

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Senin, 25 September 2017	07.30 - 16.00	Pengerjaan Tugas Khusus	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Selasa, 26 September 2017	07.30 - 12.00	Pengerjaan Laporan	PT PERTAMINA (PERSERO) REFINERY UNIT V BALIKPAPAN
		13.00 - 16.00	Pengerjaan Tugas Khusus	

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Rabu, 27 September 2017	07.30 - 12.00	Pengerjaan laporan	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)
		13.00 - 16.00	Pengerjaan Tugas Khusus	

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Kamis, 28 September 2017	07.30 - 16.00	Pengerjaan Laporan	PT (PERTAMINA) REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Jumat, 29 September 2017	07.30-16.00	Pengerjaan Laporan	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda Tangan & Stempel Perusahaan
	Senin, 2 Oktober 2017	07.30 - 16.00	Pengerjaan Tugas Khusus	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Selasa, 3 Oktober 2017	07.30-16.00	Pengerjaan Tugas Khusus	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Rabu, 4 Oktober 2017	07.30 - 16.00	Pengerjaan Tugas Khusus	PT. PERTAMINA RU V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Kamis, 5 Oktober 2017	07.30 - 16.00	Diskusi Pengerjaan Tugas Tambahan	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Jumat, 6 Oktober 2017	07.30 - 16.00	Diskusi Pengerjaan Tugas Tambahan	PT. PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Senin, 9 oktober 2017	07.30-16.00	Pengerjaan Laporan	PT. PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Selasa, 10 Oktober 2017	07.30 - 16.00	Pengerjaan Laporan	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Rabu, 11 Oktober 2017	07.30 - 16.00	Pengerjaan Laporan	PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Kamis, 12 Oktober 2017	07.30 - 16.00	Pengerjaan laporan	

PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Jumat, 13 Oktober 2017	07.30 - 16.00	Pengerjaan Laporan	

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Senin, 16 Oktober 2017	07.30 - 16.00	Pembimbingan Laporan	

PT PERTAMINA (PERSERO) REFINERY UNIT V BALIKPAPAN

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Selasa, 17 Oktober 2017	07.30-16.00	Pembimbingan Laporan	

PT PERTAMINA (PERSERO) REFINERY UNIT V BALIKPAPAN

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Rabu, 18 Oktober 2017	07.30 - 16.00	Pembimbingan Laporan	

PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Kamis, 19 Oktober 2017	07.30-16.00	Pembimbingan Laporan	

PT PERTAMINA REFINERY UNIT BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Jumat, 20 Oktober 2017	07.30-16.00	Pembimbingan Laporan	

PT PERTAMINA (PERSERO) REFINERY UNIT V BALIKPAPAN

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Senin, 23 Oktober 2017	07.30 - 16.00	Pembimbingan Laporan	

PT PERTAMINA REFINERY UNIT BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Selasa, 24 Oktober 2017	07.30 - 16.00	Pembimbingan laporan	

PT PERTAMINA (PERSERO) REFINERY UNIT V BALIKPAPAN

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Rabu, 25 Oktober 2017	07.30- 16.00	Pembimbingan Laporan	

Catatan penting harian:

Catatan dari pembimbing lapangan:

Program Studi Teknik Industri Universitas Atma Jaya Yogyakarta Catatan

Harian Pelaksanaan Kerja Praktek

No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Kamis, 26 Oktober 2017	07.30 - 16.00	Pembimbingan Laporan	

PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Kamis, 26 Oktober 2017	07.30 - 16.00	Pembimbingan Laporan	

PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Jumat, 27 Oktober 2017	07.00 - 16.00	Pembimbingan Laporan	

PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Senin, 30 Oktober 2017	07.30-16.00	Pembimbingan Laporan	

PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan:

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No.	Hari, Tanggal	Jam	Kegiatan	Tanda tangan & stempel perusahaan
	Selasa, 31 Oktober 2017	07.30 - 16.00	Pengurusan Dokumen & Sertifikat	

PT PERTAMINA REFINERY UNIT V BALIKPAPAN (PERSERO)

Catatan penting harian:

Catatan dari pembimbing lapangan: